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R E P O R T S  
FROM  
C O M M I T T E E S:  
TEN VOLUMES.

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— (10.) —

THAMES FLOODS PREVENTION;  
THAMES RIVER (PREVENTION OF FLOODS) BILL;  
TURNPIKE ACTS CONTINUANCE.

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Session  
8 *February* — 14 *August* 1877.

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17  
VOL. XVII.

1877

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1879, Oct. 6.  
Summer fund.

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(280.)  
1883, Jan. 19.

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# REPORTS FROM COMMITTEES:

1877.

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## TEN VOLUMES:—CONTENTS OF THE TENTH VOLUME.

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N.B.—*THE* Figures at the beginning of the line, correspond with the N° at the foot of each Report; and the Figures at the end of the line, refer to the MS. Paging of the Volumes arranged for The House of Commons.

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- ✓ 367. Report from the Select Committee on Thames Floods Prevention; together with the Proceedings of the Committee, Minutes of Evidence, Appendix, and Index - - - - - p. 1

### THAMES RIVER (PREVENTION OF FLOODS) BILL:

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**R E P O R T**

**FROM THE**

**SELECT COMMITTEE**

**ON**

**THAMES FLOODS PREVENTION;**

**TOGETHER WITH THE**

**PROCEEDINGS OF THE COMMITTEE,**

**MINUTES OF EVIDENCE,**

**AND APPENDIX.**

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*Ordered, by The House of Commons, to be Printed,*  
*27 July 1877.*

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*Tuesday, 10th April 1877.*

*Ordered, THAT a Select Committee be appointed on the Thames Conservancy Acts, to inquire and report what Amendments, if any, are required in order to deal more effectually with the injuries inflicted by Floods.*

*Monday, 30th April 1877.*

Committee nominated of—

Sir Trevor Lawrence.  
Mr. Samuelson.  
Mr. Richardson-Gardner.  
Mr. Walter.  
Sir Charles Russell.  
Mr. William Cartwright.  
Mr. Hall.

Mr. Watney.  
Colonel Carington.  
Mr. Charles Praed.  
Admiral Egerton.  
Mr. William Henry Gladstone.  
Mr. Coope.

*Ordered, THAT the Committee have power to send for Persons, Papers, and Records.*

*Ordered, THAT Five be the Quorum of the Committee.*

*Tuesday, 19th June 1877.*

*Ordered, THAT the Petition from Iffley, for inquiry into state of River near Iffley, be referred to the Committee.*

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## R E P O R T.

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THE SELECT COMMITTEE appointed on the THAMES CONSERVANCY ACTS, and to inquire and report what Amendments, if any, are required in order to deal more effectually with the Injuries inflicted by FLOODS :  
—HAVE considered the matters to them referred, and have agreed to the following REPORT:—

1. YOUR Committee report that they have inquired into the past and present government of the River Thames, and have heard evidence as to its condition and that of the works upon it above the district of the Metropolitan Board of Works, and also as to the frequency and severity of floods during recent years.

2. The Thames Conservancy was established in 1857 by a compromise between the Crown and the Corporation of London. The Board consisted of 12 members, seven nominated by the Corporation of London, two by the Admiralty, two by the Trinity House, and one by the Board of Trade; with jurisdiction over the river for the purpose of navigation from Yantlet Creek to Staines. This number was raised in 1864 to 18 members, by the addition of two elected by the owners of ships, one by owners of passenger steamers, two by owners of lighters and steam-tugs, and one by dock owners and wharfingers.

3. Prior to the year 1866, that part which in contradistinction to the part of the river below Staines is termed the Upper River, was vested in a very numerous body of Commissioners, all of them, however, owners of property in the Thames Valley, or official representatives of riparian towns, and therefore familiar with local interests. It is further on record, in the Report made by a Committee of your House in 1865, that "The river was practically managed by a Committee of 15 Commissioners, chosen from five districts, into which the navigation was divided, three from each." These Commissioners were wholly dependent on the proceeds of tolls for available funds. They received for their services no salaries or fees. In 1843 the proceeds of the tolls amounted to the sum of 14,000 *l.*, but after that period they decreased year by year, until in 1865 they had fallen to 3,000 *l.*, to the consequent increasing neglect of the works requisite for maintenance of the river in a proper condition for navigation. This falling off in the revenues of the Commissioners was, in the Committee's Report already referred to, ascribed to the diversion of traffic from the river which had followed the construction of railways. It was this unsatisfactory state of the upper section of the Thames that in 1865 led to the appointment of the Parliamentary Committee, which was instructed "to inquire what steps should be taken for the better management of the Thames above Staines, with regard to the maintenance and improvement of its navigation, and to the proper regulation of the depths and levels of its waters." The Committee reported that many locks and weirs above Teddington Lock were in a ruinous state; that a debt had been incurred by the Commissioners amounting to 88,000 *l.*, on which no interest had been paid since 1863, and that the tolls had dwindled, as above mentioned, to 3,000 *l.*, through diversion of traffic by the railways from the river. In consequence of this Report, the Act 29 & 30 Vict., c. 89 was passed, entitled "An Act for vesting in the Conservancy of the River Thames the Conservancy of the Thames and Isis from Staines, in the County of Middlesex, to Cricklade, in the County of Wilts." By the provisions of this Act, five new members were added to the Board of Conservancy, viz., one nominated by the Board of Trade, and four to be elected by the old Commissioners, making in all 23 members; and these provisions are still in force.

4. The old Commissioners were an authority purely for navigation purposes ; and the Act of 1866 conferred no powers on the Conservators other than the old Commissioners had, except the power of preventing the towns from turning their sewage into the river, or its tributaries for five miles above their junction with the Thames. With this exception the Conservators have power over the bed, and to a limited extent over the banks of the River Thames only, and these solely for navigation purposes. They have no power to execute works on the Thames itself except for navigation, and no power to make new cuts, or otherwise to deal with the adjoining lands, except for purposes of navigation ; they have no power over any tributaries except the control over the sewage above referred to.

5. The Revenue of the Conservators as to the Upper River is derived—

1st. From tolls on traffic in merchandise.

2nd. From tolls on steamers and pleasure boats.

3rd. From the rents paid by the London Water Companies drawing their water from the Thames.

6. The evidence shows that the chief traffic is between Staines and Oxford, and that even on that portion the tolls from traffic in merchandise have decreased notwithstanding the restoration to a great extent between Staines and Oxford of the locks and other works connected with navigation by the Conservators. The navigation above Oxford for merchandise traffic has virtually ceased, owing to the decay and removal of weirs, want of dredging, and the generally neglected condition of the river ; the whole tolls above Oxford, from merchandise and pleasure-boat traffic, having realised only 43*l.* 8*s.* per annum on the average of the 10 years ending December 1876.

7. Your Committee, following the analogy of other portions of the river, where there is sufficient water for traffic, and where the works have been restored by the Conservators, are not hopeful that, even if the navigation works were put into good order, any large traffic would spring up above Oxford, though evidence has been given that this part of the river would be used to an increased extent if it were made navigable ; however this may be, your Committee cannot recommend that navigation on any part of the River Thames should be abandoned.

8. In 1869, the Conservators projected considerable works from King's Weir to Sandford, a distance of seven miles. These works were chiefly aimed at the lowering of the water-level around Oxford, and the Conservators brought a Bill into Parliament to enable them to tax the lands in the riparian parishes of the Thames from Long Wittenham to Cirencester, with a view to provide funds for carrying out these works, and generally for doing works of drainage.

9. The Bill met with strong opposition from the owners and occupiers of the lands proposed to be taxed, and the Conservators abandoned that part of their scheme. This led to an application to Parliament by the owners of riparian lands for powers of drainage on a comprehensive scale, and by the Thames Valley Drainage Act, 1871, a Board of Commissioners was incorporated, styled The Thames Valley Drainage Commissioners, with rating and other large powers over the River Thames above Clifton Hampden, its tributaries, and the adjacent lands, and over mills and water easements.

10. The powers over mills are peculiarly valuable on the upper part of the river, and on the tributaries where the area of obstruction caused by the mills is larger in proportion to the total discharge than on the lower portion. The obstruction caused by mills on the lower part of the Thames appears, according to the evidence, to be less than had been generally supposed.

11. The Thames Valley Drainage Commissioners were constituted the authority for executing works for drainage, embankment, and irrigation of lands, and for control and regulation of floods, and they have rating authority over 55,000 acres, and a jurisdiction for purposes of works over more than 80,000 acres ; their power of executing works in the bed and banks of the Thames itself is subject to the consent of the Conservators, though, if that consent be refused, the Commissioners may appeal to the Board of Trade. It does not appear that

if

if the Commissioners executed works in the Thames itself for the prevention of floods, they would have any control over them after their completion without the consent of the Conservators.

12. The first Commissioners named in the Act discharged the preliminary duties entrusted to them by obtaining plans and levels for the purpose of ascertaining the territorial limits of their jurisdiction ; dividing the area into districts ; fixing the number of members of district boards, and holding the elections of the first members of those boards by the ratepayers. This work, and the election of the present Drainage Commissioners, was completed in September 1876, whereupon the powers of the first Commissioners ceased.

13. It appears that two of the districts have undertaken works for drainage on the tributaries, and that the original Commissioners during their term of office executed some urgent arterial works on one of those tributaries, but no general plan of works has yet been laid down, the elected Commissioners having stayed proceedings pending the inquiry of your Committee.

14. Below Long Wittenham, no authority exists having special powers for the prevention of floods, or for arterial drainage. Misapprehension on this point has led witnesses to charge the Conservators with neglect in the execution of adequate works for the relief of floods.

15. Your Committee are of opinion that the works executed by the Conservancy as far as they have gone have been effectually done for the purpose for which they were intended, viz., the maintenance of navigation ; and that they have afforded relief to drainage in various parts of the river by the removal of obstructions, construction of tumbling bays, and in other ways. It would have been impossible for them to undertake works specially designed for the relief of floods, or for drainage of the land, unless they had obtained not only special powers for that purpose, but also rating powers to provide the necessary funds.

16. The evidence shows that great opposition would be made both by land-owners and towns to the granting of rating powers to the Conservancy ; at any rate without a great change in the constitution of the Board. It appears therefore to your Committee that for the purposes of drainage and the prevention of floods below Long Wittenham the proper course would be for riparian owners and occupiers to unite and obtain powers to establish an arterial drainage authority.

17. The Conservators having a staff already at work for navigation purposes, and having expended large sums on this part of the river, it may be worth the consideration of the riparian interests there whether the above duties might not be advantageously delegated to the Conservancy ; an adequate riparian representation being provided on the Conservancy Board. Some of the weightiest objections held by the landowners and others in the district above Day's Lock against the Conservators as an authority for the prevention of floods do not apply to the riparian interests nearer London.

18. The rents now paid by the different Water Companies are as follows : A sum of 1,450 *l.* payable by five water companies (viz., the Grand Junction, the West Middlesex, the Southwark and Vauxhall, the Lambeth, and the Chelsea) supplying the Metropolis from the Thames under an agreement made in 1852, between them and the Corporation of London, and applied to that portion of the river between Teddington and Staines. A sum of 5,000 *l.* payable by the same Water Companies under the Act of 1866. A sum of 1,500 *l.* (to be raised in 1881 to 2,000 *l.*) payable by the East London Water Company, and a sum of 50 *l.* payable by the West Surrey Water Company, making a total of 8,000 *l.* (to be raised in 1881 to 8,500 *l.*) These rents have been imposed in return for benefits received by the water companies from the maintenance of the purity of the water by the exclusion of pollutions, the equalisation of the flow of water, and the insuring the summer supply by the widening and deepening of the reaches and other works. It appears to your Committee that these rents are insufficient to remunerate the authorities entrusted with these duties for properly carrying them out, and that they might with fairness be increased. These companies have power to take 110,000,000 gallons per day, equal to one-third of the summer flow, and about one-ninth of the average flow, and they actually



do take more than half that quantity. The revenues of the Water Companies have increased greatly of late years in consequence of the re-valuation of property in the metropolis, quite apart from the increase of the extent of the property subject to rating; should the rents payable by them be increased, it might be desirable to give to the Water Companies some representation on the Conservancy Board.

19. Your Committee are of opinion that a further sum of 6,250 *l.* per annum should be paid by the five original contributory companies, making in all 14,250 *l.*, exclusive of the addition in 1881. Of this a sum of 8,700 *l.* (being an excess of 700 *l.* above that now received by the Conservators for all purposes), your Committee think should for the future be applicable solely to navigation works, leaving the surplus of 5,550 *l.* to be applied to works for prevention of floods, purification of water, and dredging or improvement of the reaches, with a view to the summer water supply.

20. Your Committee recommend that, of this sum of 5,550 *l.*, 550 *l.* be applied to the river between Teddington and Staines; 2,500 *l.* to the river between Staines and Long Wittenham; and that the remaining 2,500 *l.* shall be applied by the flood authority for the same purposes between Long Wittenham and Cricklade. The 500 *l.* per annum accruing in 1881 should be divided equally between navigation and prevention of floods.

21. It is desirable that a good understanding should prevail between the Drainage Commissioners and the Conservators, to which end it would be expedient that the Commissioners should send two or more representatives to the Conservancy Board.

22. The appointment by the Conservators of committees for local superintendence, which committees would naturally include those best acquainted with the localities, would have a similar tendency. These committees would draw the attention of the Conservancy Board to local wants and complaints, and would often become the channel of friendly communication between the Conservators, the Thames Valley Drainage Commissioners, and generally the riparian owners and occupiers. As it appears that the entire revenue from navigation between Staines and Cricklade in the year ending 31st December 1876 only amounted to 3,909 *l.* 11 *s.* 1 *d.*, it is obvious that the control of floods is of paramount importance on the Upper River.

23. Your Committee consider it essential that whatever body may at any time have authority over any portion of the Thames for the purposes of drainage and prevention of floods should also have control over the tributaries falling into it for the same purposes over such distance as the circumstances may require.

24. The evidence your Committee have taken, shows that but little injury is done by ordinary winter floods; but similar floods occurring in summers have been productive of much damage. Ordinary floods are of frequent occurrence, and have been augmented by eyots, weeds, shoals, and other obstructions on the river. Besides the removal of these obstructions, evidence has been given that works can be constructed which, while improving the navigation, would materially diminish floods. Of these, a cutting at Teddington, estimated by the engineer of the Conservators to cost less than 5,000 *l.*, would appear to be the most important. The Committee trust that, by the construction of this work, by increasing the area of tumbling bays, and by additional dredging, this end will be attained. It is desirable that expedition should be used in opening the floodgates, weirs, &c., whenever floods are to be apprehended.

25. In years of extraordinary floods, there is no question that much injury is inflicted on lands contiguous to the river, and to a still more serious extent on buildings, which have in many cases, however, been built within the flood limits. At the same time, Table No. 1 shows that there is no ground for the belief, which seems to be generally entertained, that exceptional floods,—which bring down a body of water equal to from thirty to forty times the ordinary summer flow,—have been higher or more frequent of late years than they were formerly. It appears from the Table, that four great floods occurred in the decade of 1820–1830, viz., in the years 1821, 1823, 1824, and 1828; from that time to 1852, they were less numerous and less high. In the latter year the  
water

water level at Staines exceeded that of the highest floods of 1875, and of the winter of 1876-77 by three inches. Between 1852 and the great floods of 1875, and of the winter of 1876-77, no very high floods occurred.

26. In order to prevent these floods from submerging adjacent lands and dwellings throughout the Thames Valley, works of enormous magnitude and cost would be required; and although in some instances that cost might be repaid by the benefit which the owners and occupiers would derive from their execution, this would be exceptional. Such works therefore, where desirable, should be carried out by individual or associated owners, or by the local authorities, subject to the consent and control of the Arterial Drainage Authority, who would take care that the works did not prejudicially affect adjacent lands, or interfere with the general plan of drainage.

27. Your Committee, having regard to the large expense already incurred by the Conservators and the Thames Valley Drainage Commissioners in obtaining their Acts of Parliament, and for other reasons, recommend that any legislation necessary to give effect to these recommendations should be initiated and carried through by the Local Government Board.

27 July 1877.

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## PROCEEDINGS OF THE COMMITTEE.

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*Monday, 7th May 1877.*

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### MEMBERS PRESENT:

Mr. Coope. Mr. William Henry Gladstone. Mr. William Cartwright. Mr. Walter.		Sir Trevor Lawrence. Mr. Richardson-Gardner. Mr. Charles Praed. Mr. Watney.
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Mr. COOPE was called to the Chair.

The Committee deliberated.

[Adjourned till Friday next, at Twelve o'clock.]

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*Friday, 11th May 1877.*

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### MEMBERS PRESENT:

Mr. COOPE in the Chair.

Mr. Richardson-Gardner. Mr. Walter. Sir Charles Russell. Mr. Watney.		Sir Trevor Lawrence. Mr. William Cartwright. Mr. Samuelson.
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Mr. *William J. Taylor*, Mr. *George Dines*, Very Reverend Dr. *Liddell* (Dean of Christchurch), and Mr. *Thomas Charwood*, were severally examined.

[Adjourned till Monday next, at Twelve o'clock.]

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*Monday, 14th May 1877.*

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### MEMBERS PRESENT:

Mr. COOPE in the Chair.

Mr. Walter. Sir Charles Russell. Mr. Samuelson. Colonel Carington. Mr. Richardson-Gardner.		Mr. William Henry Gladstone. Mr. Charles Praed. Mr. William Cartwright. Sir Trevor Lawrence. Mr. Watney.
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Mr. *Robert Hawkins*, Colonel *Harcourt*, and the Reverend *J. C. Clutterbuck*, were severally examined.

[Adjourned till Friday, 8th June, at Twelve o'clock.]

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*Friday, 8th June 1877.*

MEMBERS PRESENT:

Mr. COOPE in the Chair.

Mr. Walter.  
Sir Charles Russell.  
Sir Trevor Lawrence.  
Mr. William Cartwright.  
Mr. Hall.

Mr. William Henry Gladstone.  
Mr. Richardson-Gardner.  
Admiral Egerton.  
Colonel Carington.

Mr. Charles Neate, Mr. John Thowle, Mr. Robert Elleft, and Mr. Thomas Arkell, were severally examined.

[Adjourned till Monday next, at Twelve o'clock.]

*Monday, 11th June 1877.*

MEMBERS PRESENT:

Mr. COOPE in the Chair.

Mr. William Cartwright.  
Mr. William Henry Gladstone.  
Mr. Hall.  
Mr. Charles Praed.  
Colonel Carington.

Mr. Walter.  
Sir Trevor Lawrence.  
Admiral Egerton.  
Mr. Richardson-Gardner.  
Sir Charles Russell.

Mr. William Bryan Wood, Mr. Robert Castle, Mr. William D. Mackenzie, Mr. William E. Saker, Mr. William Woodbridge, and Mr. Stephen Pullyn, were severally examined.

[Adjourned to Friday next, at Twelve o'clock.]

*Friday, 15th June 1877.*

MEMBERS PRESENT:

Mr. COOPE in the Chair.

Mr. Richardson-Gardner.  
Sir Trevor Lawrence.  
Admiral Egerton.

Mr. Samuelson.  
Mr. Watney.  
Sir Charles Russell.

Mr. Henry Darvill, Mr. William Hood, Mr. Henry Day, Mr. William Donaldson, the Rev. C. Wolley Dod, Mr. John T. Mills, Mr. Walter Wilkinson, Mr. Christopher Tower, and Sir Patrick Colquhoun, were severally examined.

[Adjourned till Monday next, at Twelve o'clock.]

*Monday, 18th June 1877.*

MEMBERS PRESENT:

Mr. COOPE in the Chair.

Mr. Walter.  
Colonel Carington.  
Mr. Hall.  
Sir Charles Russell.  
Mr. William Cartwright.  
Mr. Watney.

Mr. William Henry Gladstone:  
Sir Trevor Lawrence.  
Mr. Charles Praed.  
Mr. Samuelson.  
Mr. Richardson-Gardner.

Sir John Hawkshaw was examined.

Mr. William Saker was further examined.

Mr. Stephen Leach and Mr. Robert Rawlinson, C.B., were severally examined.

[Adjourned till Friday next, at Twelve o'clock.]

*Friday, 22nd June 1877.*

MEMBERS PRESENT :

Mr. COOPE in the Chair.

Mr. William Cartwright.  
Mr. Hall.  
Admiral Egerton.

Mr. Watney.  
Mr. Walter.  
Sir Trevor Lawrence.

Mr. *Rawlinson*, C.B., was further examined.

Sir *Gilbert East*, Bart., and Admiral Sir *Frederick Nicolson*, Bart., C.B., were severally examined.

[Adjourned till Monday next, at Twelve o'clock.]

*Monday, 25th June 1877.*

MEMBERS PRESENT :

Mr. COOPE in the Chair.

Mr. Richardson-Gardner.  
Mr. William Henry Gladstone.  
Sir Trevor Lawrence.  
Mr. William Cartwright.

Mr. Hall.  
Mr. Watney.  
Sir Charles Russell.  
Mr. Walter.

Admiral Sir *F. Nicolson*, Bart., C.B., was further examined.

Mr. *G. H. Vansittart*, the Rev. *F. T. Wethered*, Captain *Etheridge*, Mr. *T. J. Nelson*, and Lord *Otho Fitz-Geral*, were severally examined.

Mr. *Leach* and Mr. *Hawkins* were further examined.

[Adjourned till Friday next, at Twelve o'clock.]

*Friday, 29th June 1877.*

MEMBERS PRESENT :

Mr. COOPE in the Chair.

Sir Charles Russell.  
Sir Trevor Lawrence.  
Mr. William Cartwright.  
Admiral Egerton.

Mr. William Henry Gladstone.  
Mr. Hall.  
Mr. Charles Praed.  
Mr. Richardson-Gardner.

Admiral Sir *F. Nicolson*, Bart., C.B., Mr. *Travers Faulkner*, and the Rev. *T. H. T. Hopkins*, were severally examined.

Mr. *R. S. Hawkins* and Mr. *S. Leach* were further examined.

[Adjourned till Friday, 13th July, at Twelve o'clock.]

*Friday, 13th July 1877.*

MEMBERS PRESENT :

Mr. COOPE in the Chair.

Mr. Samuelson.  
Mr. Charles Praed.  
Mr. William Cartwright.  
Sir Charles Russell.  
Mr. Walter.  
Colonel Carington.

Sir Trevor Lawrence.  
Mr. Richardson-Gardner.  
Admiral Egerton.  
Mr. William Henry Gladstone.  
Mr. Hall.

Mr. *Charles Owen*, Mr. *Thomas Alden*, Mr. *William Ludlow*, and Mr. *John Taunton*, were severally examined.

Admiral Sir *F. Nicolson*, Bart., C.B., and Mr. *S. Leach* were further examined.

[Adjourned till Friday, at Twelve o'clock.]

Friday, 20th July 1877.

MEMBERS PRESENT:

Mr. COOPE in the Chair.

Mr. Walter.  
Sir Charles Russell.  
Sir Trevor Lawrence.  
Mr. William Cartwright.  
Mr. Watney.  
Admiral Egerton.

Mr. Samuelson.  
Mr. Hall.  
Mr. William Henry Gladstone.  
Colonel Carington.  
Mr. Charles Praed.  
Mr. Richardson-Gardner.

DRAFT REPORT, proposed by the *Chairman*, read the first time, as follows:

"1. The Thames Conservancy was established in 1857 through a compromise that was effected between the Crown and the Corporation of London, and the Board consisted of 12 members, seven being nominated by the Corporation of London, two by the Admiralty, two by the Trinity House, and one by the Board of Trade, with jurisdiction over the river for the purpose of navigation from Yantlet Creek to Staines. This number was raised in 1864 to 18 members, by the addition of two elected by the owners of ships, one by owners of passenger steamers, two by owners of lighters and steam tugs, and one by dock owners and wharfingers.

"2. In 1365, a Committee reported that many of the locks and weirs in the upper part of the river above Teddington Lock were in a ruinous state; that a debt had been incurred by the Commissioners empowered by old Acts of Parliament amounting to 88,000 £, on which no interest had been paid since 1863, and that the tolls which in 1843 had been 14,000 £, had now fallen to 3,000 £. In consequence of this Report the Board was entrusted in 1866 with jurisdiction over the whole river to Cricklade, and five more members were added, viz., one additional, nominated by the Board of Trade, and four (each of whom are landowners in the valley) elected by the old Commissioners, and making in all 23 members, of which the present Board consists, seven representing the Corporation, two the Admiralty, two the Trinity House, two the Board of Trade, two the shipowners, one the steamer owners, two the lightermen, one the wharfingers, and four the old Commissioners.

"3. With a view to the supply of water to the Metropolis, the Board was by the same Act empowered to take all needful measures for maintaining the purity of the water in the river, and to exclude all pollutions. It being held that the five water companies supplying the Metropolis from the Thames were benefited thereby, as well as by the flow of water being equalised through the works carried out for the maintenance of the navigation, it was enacted that they should each contribute a further sum of 1,000 £, or 5,000 £ a year, in addition to their contributions under arrangements of 1852, of the sum of 1,450 £. In 1867 the East London Water Company, taking its main supply from the River Lee, obtained powers to take a supplemental supply from the Thames, for which it was to contribute 1,000 £ in 1871, to be raised to 1,500 £ in 1876, and to 2,000 £ in 1881. To these sums is to be added 50 £ paid by the West Surrey Water Company, and making a total payment of 8,000 £ (to be raised in 1881 to 8,500 £) by the Companies, of which 1,450 £ is applicable to the lower, and the remainder to the upper river.

"4. While much still remains to be done for the maintenance of the navigation, especially in the upper part of the river, in repairs to locks and weirs, in dredging, and in removing shoals, weeds, and other obstructions, and while, as is alleged, in some instances the sills of the weirs have been raised so as to cause floods, the works carried out by the Thames Conservancy would appear, on the whole, to have been executed well and judiciously as far as their funds would admit.

"5. The Thames Valley Drainage Commissioners were empowered, in 1871, to carry out drainage works from Clifton Hampden, upwards, to Cricklade, and to levy rates on all lands along the banks, which should be in height up to five feet above the flood marks. The district liable to rates has been defined by an elaborate and carefully prepared plan made by the Ordnance Survey for the purpose; and, further, the valley has been divided into districts, and local boards have been appointed, but as yet no drainage works have been carried out, nor plans prepared. They allege, that the Conservators being more concerned with the lower and more important part of the river, holding their meetings in London, have little or no interest in common with them in the upper part; and also, that their expenditure in maintaining the works of that part has not been at all commensurate with their receipts. It is obvious that the owners of property in the upper part are insufficiently represented, as at present they have only four representatives on a board consisting of 23 members. On the point of outlay, however, the Report of the Conservancy of 17th February 1877 would show that while the receipts for the upper part for the last 10 years have been about 100,000 £ that the expenditure has been fully equal to that amount during the same period.

" 6. During the present century there have been but four unusually high tides, occurring in 1821 (the highest), in 1852, in 1875, and at the commencement of this year, their respective heights above the flood mark at Staines (which is 40 feet above Trinity high water-mark at Teddington Lock) being 7 feet, 6 feet, 5 feet 8 inches, and 5 feet 9 inches. Less severe floods have been of frequent occurrence, and though the pastures in several instances have been benefited, the arable land, houses, and cottages within their influence have sustained serious injury; much inconvenience, and some sickness, has been caused, and the water has been rendered thick and turbid by the soil and manure being washed into it, and by the sewage on irrigation farms, as at Reading, being in high floods partially brought into the river. The floods have been augmented by the increase in land drainage, by obstructions being allowed to grow up, and by such structures as the bridges erected at Sonning and Maidenhead.

" 7. In order to keep the high floods under control, it has been suggested that embankments be formed on either side at some distance from the river, and making a channel sufficiently wide to carry off the flood waters. As much of the water comes from the high grounds, and would be shut out by this arrangement; as the soil in many parts of the valley is of a porous nature, through which the water would percolate to the outside of the embankment; and as the outlay for such a work would manifestly be very serious, and such as would raise much opposition from ratepayers liable for it, it is inexpedient to carry out this scheme. While the ordinary summer flow of the river is about 400 millions of gallons a day, in a high flood it is estimated that it may be at least sixty times that amount, forming such a volume of water as must be difficult, if not impossible, to control. But moderate floods may be kept in check by removing obstructions, straightening bends, forming new channels, deepening the bend by dredging, and by increasing the number and capacity of the tumbling bays; and these works can be carried out at no very great expenditure, while by their means the navigation would at the same time be improved.

" 8. While the navigation of the tidal part of the river is remunerative, the financial position of that part above Teddington, taken over by the Conservators in 1866, is far from satisfactory. The income arising from tolls is not on the increase, and is barely sufficient to meet the current expense of lock-keepers and repairs; and while many works are still delayed through want of funds, a debt has been incurred to the Public Loan Commissioners of 40,000*l.* (of which 6,000*l.* has been repaid), and a further sum, approaching to 11,000*l.*, has been advanced by the Conservancy from the funds of the lower part of the river, making a deficit of about 45,000*l.*

" 9. It is essential that further funds should be supplied, in order that the floods should be controlled, and the navigation maintained. The question of rating property in the valley for this purpose involves so many difficulties (as has just been exemplified in the metropolis), and would meet with so much opposition, that it is not desirable to adopt this measure unless other resources fail. It is advisable that the tariff for pleasure-boats, and especially for steam launches, be raised; but the funds from this source by themselves would be altogether inadequate for the purpose.

" 10. As regards the payments of the five Water Companies taking their supply from the Thames, they were entitled in 1866, on payment of 1,000 *l.* a year each, to draw to the extent of 20,000,000 gallons daily. The following year the East London Water Company was entitled to draw 10,000,000 gallons daily, the payment now being 1,500 *l.*, to be increased in 1881 to 2,000 *l.* a year. By the Act of 1868 the New River Company and the East London Water Company were required to contribute between them 5,000 *l.* a year to the Lee Conservancy for the water abstracted from that river, the only limit in quantity being that the navigation were not affected thereby, and each Company was entitled to two representatives on the Conservancy. Recent legislation would thus seem to indicate that a higher scale of payment should be required of the Water Companies; and, under all the circumstances, it does not appear unreasonable that the five Companies, taking a maximum of 20,000,000 gallons per diem, should contribute the further sum of 1,000 *l.* each, to be applied by the Conservancy in mitigation of the floods in the Upper River. The Report of the Royal Commission presided over by the Duke of Richmond in 1869, with a view to the Metropolitan Water Supply, suggested the necessity of storing the flood waters of the Thames, and it now appears expedient that large impounding reservoirs be formed in the neighbourhood of Oxford for storing the flood waters, which, though tending only in a slight degree to mitigate floods, would prove of great advantage to the future supply of water to the Metropolis.

" 11. It is essential that there be one paramount authority having general jurisdiction over the whole river, as well as full control over the weirs and the tackle of the mills on its tributaries, and it is obvious that the Thames Conservancy, possessing the necessary staff and machinery, added to the experience of many years of management, should be continued in the exercise of that authority, with increased powers, especially as to mitigating floods, controlling the banks, and upholding the towing-paths. The Drainage Commissioners should carry out their works subject to the approval of the Thames Conservancy, and in case of a conflict of authority, the Board of Trade should decide. But with extended powers it is necessary that the Conservancy be more representative in its character, and at the same time that the number of its members be not inconveniently increased. The Report of the Committee of 1863 recommended that the members nominated by the Corporation of London should not be less than three. Regarding the comprehensive duties that would devolve on the Conservancy, and its enlarged sphere of action, together with the interests involved of the upper part of the

the river, it is expedient that the members of the Corporation be limited to three, and that there be added to the Board representatives of Oxford University, Eton College, the Corporations of Oxford, Reading, Windsor, and Kingston, the sanitary authority of Staines, with one additional member (a landowner in the valley) to be nominated by the old Commissioners, and two to be nominated by the five Water Companies, thus constituting a Board of twenty-nine members to superintend the navigation, to uphold and improve the purity of the water for the metropolis, and specially to undertake the mitigation of floods."

The Committee deliberated.

[Adjourned till Thursday next, at Twelve o'clock.]

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*Thursday, 26th July 1877.*

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MEMBERS PRESENT :

Mr. COOPE in the Chair.

Mr. Samuelson.  
Mr. Hall.  
Mr. William Cartwright.  
Sir Trevor Lawrence.  
Sir Charles Russell.

Mr. Walter.  
Mr. Richardson-Gardner.  
Mr. Charles Praed.  
Mr. William Henry Gladstone.  
Mr. Watney.

DRAFT REPORT proposed by Mr. Samuelson, read the first time, as follows:—

"1. YOUR Committee report that they have inquired into the past and present government of the River Thames from Staines upwards, and have heard evidence as to its condition and that of the works upon it.

"2. They find that, prior to the year 1866, that part which in contradistinction to the part of the river below Staines is termed the Upper River, was vested in a very numerous body of Commissioners, all of them, however, owners of property in the Thames Valley, or official representatives of riparian towns, and therefore familiar with local interests. It is further on record, in the Report made by a Committee of your House in 1865, that 'The river was practically managed by a Committee of 15 Commissioners, chosen from five districts, into which the navigation was divided, three from each.' These Commissioners were wholly dependent on the proceeds of tolls for available funds. They received for their services no salaries or fees. In 1843 the proceeds of the tolls amounted to the sum of 14,000 £., but after that period they decreased year by year, until in 1865 they had fallen to 3,000 £., to the consequent increasing neglect of the works requisite for maintenance of the river in a proper condition for navigation. This falling off in the revenues of the Commissioners was, in the Committee's Report already referred to, ascribed to the diversion of traffic from the river which had followed the construction of railways. It was this unsatisfactory state of the upper section of the Thames that in 1865 led to the appointment of a Parliamentary Committee, which was instructed 'to inquire what steps should be taken for the better management of the Thames above Staines, with regard to the maintenance and improvement of its navigation, and to the proper regulation of the depths and levels of its waters.' This Committee reported that many locks and weirs above Teddington Lock were in a ruinous state; that a debt had been incurred by the Commissioners, amounting to 88,000 £., on which no interest had been paid since 1863, and that the tolls had dwindled down to 3,000 £., through diversion of traffic by the railways from the river. In consequence of this Report, the Act 29 & 30 Vict., c. 89, was passed, entitled 'An Act for vesting in the Conservancy of the River Thames the Conservancy of the Thames and Isis from Staines, in the County of Middlesex, to Cricklade, in the County of Wilts.' By the provisions of this Act, five new members were added to the Board of Conservancy, viz., one nominated by the Board of Trade, and four to be elected by the old Commissioners, making in all 23 members; and these provisions are still in force. The present Board therefore consists of seven members representing the Corporation of London; two the Admiralty; two the Trinity House; two the Board of Trade; two the shipowners; one the steamers; two the lighters; one the wharfingers, and four the old Commissioners.

"3. The old Commissioners above mentioned were an authority purely for navigation purposes; and the Act of 1866 conferred no powers on the Conservators other than the old Commissioners had, except the power of preventing the towns from turning their sewage into the river or its tributaries.

"4. With this exception the Conservators have power over the beds and banks of the River Thames only, and these solely for navigation purposes.

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"5. They



"5. They have no powers to execute works on the Thames itself except for navigation, and no powers of making new cuts, or otherwise dealing with the adjoining lands, except for purposes of navigation; they have no power over any tributaries except a control over the turning of sewage into them for five miles from their junction with the river.

"6. At the time of transfer of the Upper River to the Conservators, certain rents which will be after mentioned, were made payable to them by the London Water Companies, in addition to those previously contracted to be paid under an arrangement made in 1852.

"7. It is stated in evidence that the Act of 1866, and the arrangements on which it was based, took the landowners and towns by surprise, and that had they been aware of the whole of the facts, especially of the proposed subsidy from the Water Companies, the Bill would have been opposed in Parliament. It appears that the usual Parliamentary notices by advertisement were given, but it does not appear that any notices were served on the owners of property to be affected by it, nor on the old Thames Commissioners, or any of their officers.

"8. The Revenue of the Conservators as to the Upper River is derived—

"1st. From tolls on traffic in merchandise.

"2nd. From tolls on steamers and pleasure boats.

"3rd. From the rents paid by the London Water Companies drawing their water from the Thames.

"The evidence shows that the chief traffic is between Staines and Oxford, and that even on that portion the tolls from traffic in merchandise has decreased notwithstanding the restoration to a great extent between Staines and Oxford of the locks and other works connected with navigation by the Conservators.

"9. The navigation above Oxford for merchandise traffic has virtually ceased, owing to the decay and removal of weirs, want of dredging, and the generally neglected condition of the river; the whole tolls from merchandise and pleasure-boat traffic having realised, from Lechlade to Oxford, only 43*l.* 8*s.* per annum on the average of the 10 years ending December 1876.

"10. Your Committee, following the analogy of other portions of the river, where there is sufficient water for traffic, and where the works have been restored by the Conservators, are not hopeful that, even if the navigation works were put into good order, any large traffic would spring up above Oxford, though evidence has been given that this part of the river would be used to an increased extent if it were made navigable; however this may be, your Committee cannot recommend that navigation on any part of the River Thames should be abandoned.

"11. Evidence has been given that, on some parts of the river below *Abingdon*, some relief has been afforded to drainage by removal of obstructions by the Conservators.

"12. In 1869, the Conservators projected considerable works from King's Weir to Sandford, a distance of seven miles.

"13. These works were chiefly aimed at the lowering of the water-level around Oxford, and the Conservators brought a Bill into Parliament to enable them to tax the lands in the riparian parishes of the Thames from Long Wittenham to Cirencester, with a view to provide funds for carrying out these works, and generally for doing works of drainage.

"14. The Bill met with strong opposition from the owners and occupiers of the lands proposed to be taxed, and the Conservators abandoned that part of their scheme.

"15. This led to an application to Parliament by the owners of riparian lands on that part of the Thames and its tributaries for powers of drainage on a comprehensive scale, and by the Thames Valley Drainage Act, 1871, a Board of Commissioners was incorporated, styled The Thames Valley Drainage Commissioners, with rating and other large powers over the River Thames, its tributaries, and the adjacent lands, and over mills and water easements.

"16. This body was specially constituted 'The authority for executing works for control and regulation of floods, for drainage, embankment, and irrigation of lands,' and they have rating authority over 55,000 acres, and a jurisdiction for purposes of works over more than 80,000 acres.

"17. Their power of executing works in the bed and banks of the Thames itself is subject to the consent of the Conservators, though, if that consent be refused, the Commissioners may appeal to the Board of Trade.

"18. It does not appear that if the Commissioners executed works in the Thames itself for the prevention of floods, they would have any control over them after their completion without the consent of the Conservators.

"19. The first Commissioners named in the Act discharged the preliminary duties entrusted to them by obtaining surveys and plans and levels; ascertaining the territorial limits of their jurisdiction; dividing the area into districts; fixing the number of members of district boards, and holding the elections of the first members of those boards by the ratepayers. This work, and the election of the present Drainage Commissioners, was completed in September 1876, whereupon the powers of the first Commissioners ceased.

"20. It appears that two of the districts have undertaken works for drainage on the tributaries, and that the Commissioners have also executed some urgent arterial works on one of those tributaries, but no general plan of works has yet been laid down, the Commissioners having stayed proceedings pending the inquiry of your Committee.

"21. Below

" 21. Below Long Wittenham, no authority exists having powers for the prevention of floods, or for arterial drainage.

" 22. Complaints have been made by witnesses that the Conservators have not executed adequate works for the relief of floods.

" 23. Your Committee are of opinion that the works executed by the Conservancy as far as they have gone have been effectually done for the purpose for which they were intended, viz., the maintenance of navigation. It could not be expected of them that they should execute works specially designed for the relief of floods, or for drainage of the land, unless they obtained not only special powers for that purpose, but also rating powers to provide the necessary funds.

" 24. The evidence is strong that great opposition would be made both by landowners and towns to the granting of rating powers to the Conservancy; at any rate without a very great change in the constitution of the Board.

" 25. It appears therefore to your Committee that for the prevention of floods below Long Wittenham the proper course would be for riparian owners and occupiers to unite and obtain powers to establish an arterial drainage authority.

" 26. The Conservators having a staff already at work for navigation purposes, and having expended large sums on this part of the river, it may be worth the consideration of the riparian interests there whether such duties might not be advantageously delegated to the Conservancy; an adequate riparian representation being provided on the Conservancy Board. Some of the weightiest objections held by the landowner and others in the district above Day's Lock against the Conservators as an authority for the prevention of floods do not apply to the riparian interests nearer London.

" 27. It appears to your Committee that the rents now payable by the Water Companies are insufficient, and that they might with fairness be increased. These companies have power to take 110,000 000 gallons per day, equal to one-third of the summer flow, and about one-ninth of the average flow, and they actually do take more than half that quantity.

" 28. The revenues of the Water Companies have increased greatly of late years in consequence of the re-valuation of property in the Metropolis, quite apart from the increase of the extent of the property subject to rating.

" 29. There is now paid by the Water Companies, under an agreement made in 1852, the sum of 1,450 *l.* per annum, which is applied to the river between Staines and Teddington, and under the Act of 1866 the sum of 6,550 *l.* per annum, which is applied to the river between Staines and Cricklade. In 1881 the latter sum will be increased by 500 *l.* per annum.

" 30. Your Committee are of opinion that a further sum of 5,550 *l.* per annum should be paid by the contributory companies, making in all 13,550 *l.* exclusive of the addition in 1881. Of this a sum of 8,000 *l.* (equal to that now received by the Conservators for all purposes), your Committee think should for the future be applicable solely to navigation works, leaving the surplus of 5,550 *l.* to be applied to works for prevention of floods, purification of water, and dredging or improvement of the reaches, with a view to the summer water supply.

" 31. Your Committee recommend that, of this sum of 5,550 *l.*, 550 *l.* be allocated to the river between Staines and Teddington, in addition to the 1,450 *l.* now applicable to that section; 2,500 *l.* to the river between Staines and Day's Lock; and that the remaining 2,500 *l.* should be paid to the Thames Valley Drainage Commissioners, to be applied by them for the same purposes between Day's Lock and Cricklade. The 500 *l.* per annum accruing in 1881 should be divided equally between navigation and prevention of floods.

" 32. Complaints have been made that the high-water level has been raised at the weirs in different parts of the river; among other distinct allegations your Committee would point to those of the Reverend Mr. Dodd as to the weir newly constructed by the Conservators at Windsor (No. 5, page 27, Q. 1641, *et seq.*); the evidence of Mr. Travers Falkner (No. 9, page 37, Q. 3182); Mr. Robert S. Hawkins (No. 9, page 44, Q. 3246), as to Abingdon Weir; and of Captain Mostyn Owen (No. 10, pages 1 to 15), Mr. Alden (No. 10, pages 17 to 20), Mr. Ludlow (No. 10, pages 20 to 21), as to Ifley and Weirs Mill Weirs, where it is alleged that the sills have been so raised in order to obtain a sufficient depth of water for barge steamer navigation, the bed of the river having become silted up so as not to give sufficient depth at the ancient high-water level. Mr. Leach, the officer of the Conservancy (No. 8, page 38), denies that any such raising has taken place.

" 33. Your Committee are unable to decide the point, but it is a fact that above the stone sills of certain weirs balks of timber are inserted, that these balks raise the water level, and that dredging has not been done in the upper section of the river to any appreciable extent. It appears in evidence (Mr. Leach, No. 6, page 14, Q. 1901) that the Conservators were advised by Mr. Beardmore and himself in 1866 to spend 29,000 *l.* in dredging. Their accounts show that they have not spent more than 3,000 *l.* for this purpose.

" 34. It is desirable that a good understanding should prevail between the authorities for the prevention of floods and the Conservators, to which end it would be expedient that the Commissioners should send two or more representatives to the Conservancy.

" 35. The appointment by the Conservators of committees for local superintendence, which committees would naturally include those best acquainted with the localities, would have a similar tendency. These committees would draw the attention of the Conservancy

Board to local wants and complaints, and would often become the channel of friendly communication between the Conservators and the flood authority. If it should be found that co-operation between the two bodies were not secured by some such means, it would be necessary that what has proved itself to be in the Upper River the less important interest, viz., the navigation, should give way to the more important, viz., the prevention of floods.

"36. Your Committee consider it essential that whatever body may at any time have authority over any portion of the Thames for the purposes of drainage and prevention of floods, should also have control over the tributaries falling into it for the same purposes over such distance as the circumstances may require.

"37. In the foregoing part of the Report, your Committee have referred only to works for carrying off the ordinary rainfall. But it has been stated in evidence that exceptional floods bring down a body of water equal to from 30 to 40 times the ordinary summer flow.

"38. In order to prevent these floods from submerging adjacent lands and dwellings throughout the Thames Valley, embankments of enormous magnitude and cost would be required; and although in some instances that cost might be repaid by the benefit which the owners and occupiers would derive from their execution, this would be exceptional.

"39. Such works therefore, where desirable, should be carried out by individual or associated owners, or by the local authorities, subject to the consent and control of the Arterial Drainage Authority, who would take care that the works did not prejudicially affect adjacent lands, or interfere with the general plan of drainage.

"40. Your Committee, considering the large cost already incurred by the Conservators and the Thames Valley Drainage Commissioners in obtaining their Acts of Parliament, and for other reasons, recommend that any legislation necessary to give effect to these recommendations should be initiated and carried through by the Local Government Board."

MOTION MADE, and Question proposed, That the Draft Report proposed by the Chairman be read a second time, paragraph by paragraph.—Amendment proposed, to leave out the words, "The Chairman," in order to insert the word "Mr. Samuelson"—(Mr. Samuelson)—instead thereof.—Question, That the words "The Chairman" stand part of the Question,—put, and *negatived*.

Words inserted.—Main Question, as amended, put, and *agreed to*.

DRAFT REPORT proposed by Mr. Samuelson, read a second time, paragraph by paragraph.

Paragraph 1, amended, and *agreed to*.

A new paragraph inserted.

Paragraphs 2-5, amended, and *agreed to*.

Paragraphs 6 and 7, *postponed*.

Paragraph 8, *agreed to*.

Paragraph 9, amended, and *agreed to*.

Paragraph 10, *agreed to*.

Paragraph 11, *postponed*.

Paragraphs 12-14, *agreed to*.

Paragraph 15, amended, and *agreed to*.

Another new paragraph inserted.

Paragraph 16, amended, and *agreed to*.

Paragraphs 17 and 18, *agreed to*.

Paragraphs 19-21, amended, and *agreed to*.

Paragraph 22, *disagreed to*.

Paragraphs 23-25, amended, and *agreed to*.

Paragraph 26, amended.—Amendment proposed, in line 5, to leave out from the word "Board" to the end of the paragraph—(Mr. Watney).—Question put, That the words proposed to be left out stand part of the paragraph.—The Committee divided:

Ayes, 6.

Sir Trevor Lawrence.

Mr. Samuelson.

Mr. Walter.

Sir Charles Russell.

Mr. William Cartwright.

Mr. Hall.

Noes, 4.

Mr. Richardson-Gardner.

Mr. Watney.

Mr. Charles Praed.

Mr. William Henry Gladstone.

Paragraph, as amended, *agreed to*.

Paragraphs 27—29, *postponed*.

Paragraphs 30 and 31 amended, and *agreed to*.

Paragraphs 32 and 33, *disagreed to*.

Paragraph 34, amended, and *agreed to*.

[Adjourned till To-morrow, at Eleven o'clock.

*Friday, 27th July 1877.*

**MEMBERS PRESENT:**

**Mr. COOPE** in the Chair.

Mr. Samuelson.

Sir Charles Russell.

Sir Trevor Lawrence.

Mr. Charles Praed.

Mr. William Henry Gladstone.

Mr. Hall.

Mr. Richardson-Gardner.

Mr. William Cartwright.

Draft Report further considered.

Paragraph 35, amended, and *agreed to*.

Paragraph 36, *agreed to*.

Two new paragraphs inserted.

Paragraph 37, *disagreed to*.

Paragraph 38, amended, and *agreed to*.

Paragraph 39, *agreed to*.

Paragraph 40, amended, and *agreed to*.

Postponed paragraphs 6, 7, and 11, *disagreed to*.

Postponed paragraphs 27—29, *disagreed to*.

Another new paragraph inserted.

Question, "That this Report, as amended, be the Report of the Committee to the House,"—put, and *agreed to*.

*Ordered*, To Report, together with the Minutes of Evidence, and an Appendix.

**EXPENSES OF WITNESSES.**

NAME of WITNESS.	PROFESSION or CONDITION.	From whence Summoned.	Number of Days absent from Home under Orders of Committee.	Allowance during Absence from Home.	Expenses of Journey to London and back.	TOTAL Expenses allowed to Witness.
				£. s. d.	£. s. d.	£. s. d.
William John Taylor	Secretary of the Lino- leum Company.	Staines	One	1 1 -	- 5 -	1 6 -
Thomas Charlwood	Miller	Aldermaston	One	- 15 -	- 10 6	1 5 6
Robert Hawkins	Solicitor	Oxford	One	2 2 -	1 2 -	3 4 -
Charles Neate	Esquire	Oxford	One	1 1 -	1 3 -	2 4 -
Thomas Arkell	Farmer	Swindon	One	- 10 -	1 3 -	1 13 -
John T. Mills	Farmer	Cookham	One	- 15 -	- 11 6	1 6 6
William Ludlow	Farmer	Oxford	One	- 15 -	- 16 -	1 11 -
Thomas Alden	Butcher	Oxford	One	- 15 -	- 16 -	1 11 -
Charles Owen	Chief Constable of Ox- ford.	Oxford	One	1 1 -	1 3 -	2 4 -
John H. Taunton	Civil Engineer	Stroud	One	2 2 -	1 15 -	3 17 -
Robert Castle	Land Surveyor	Oxford	One	2 2 -	1 2 -	3 4 -
				TOTAL	- - £.	23 6 -

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*Friday, 11th May 1877.*

### MEMBERS PRESENT :

Mr. William Cartwright.  
Mr. Coope  
Sir Trevor Lawrence.  
Mr. Richardson-Gardner.

Sir Charles Russell.  
Mr. Samuelson.  
Mr. Walter.  
Mr. Watney.

OCTAVIUS EDWARD COOPE, Esq., IN THE CHAIR.

Mr. WILLIAM JOHN TAYLOR, called in ; and Examined.

*Chairman.*

1. I BELIEVE you reside at Staines?—Yes, I am Secretary to the Linoleum Manufacturing Company, and also Honorary Secretary of the Thames Floods Prevention Association.

2. Have you paid great attention to the question of the floods in the valley of the Thames?—I have. I was the first to bring the matter before our local board, and they adopted it.

3. Have you been in communication with many parties along the valley of the Thames?—Yes; almost with the whole of the valley, I think, and with the various local boards and public bodies.

4. As well as local boards as the riparian owners?—Yes, both of them, more particularly the local authorities, the vestries, and so forth, and the urban authorities.

5. And you have had, I presume, yourself a personal experience of loss through floods?—A very bitter one. I am leaving my house now in consequence, in which I have been for 14 years. My dining-room has been under water for two years following, and I am leaving Staines entirely upon that account, and several others have done so. My opposite neighbour, Mr. Rixon, a solicitor, has done the same. I could have floated a child's boat in my dining-room in January last.

6. Do you consider, in a sanitary point of view, that the floods are objectionable?—No doubt. It is a very porous gravelly soil in the Thames Valley, particularly at Staines, and in our neighbourhood we are obliged to use cesspools almost entirely, which, of course, are contaminating the wells in consequence of these floods; my own well, I have not used a drop of water from it for drinking these five years, it was so bad; we have to send to the brewery for every drop of water we drink, and also for our own men. We employ upwards of

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*Chairman—continued.*

250 men, and we send every morning for water to the brewery for them to drink. If it would assist the Committee at all, I have prepared my suggestions under various heads.

7. As regards the disadvantage, in an agricultural point of view, are you able to give any evidence upon that point?—With regard to Staines and Wyrardisbury, and all the way, in fact, as far as Windsor, particularly all about Horton and Wyrardisbury, the whole of the land was one sheet of water. There are very faithful views of it in this book before me, published by Mr. Palmer; he has borrowed several of the illustrations from the "Illustrated London News" and "Graphic." On page 30 there is a view from Windsor Castle, and it was one sheet of water all the way from Windsor to Staines, more or less. Eton College is also shown on page 23 of the same book, and the same thing may be said of that district.

8. Do you consider that those floods have increased of late years or diminished?—I have here a return of every high flood from 1821, taken by two different persons both living now, viz., Mr. Curtis and Mr. Holgate. They could give the Committee evidence, but they have handed it to me.

9. Can you yourself certify to the correctness of those figures?—Not so far back as 1821, but I can for the last 14 years. The first set were taken by Mr. Curtis, a surgeon, of Staines, one of the very oldest inhabitants. The Thames rises, he says, 376 feet above the level of the sea, but the flood mark that he has taken out here is taken from the flood in 1821, which was 40 feet above Trinity high water mark at Teddington Weir. In 1821, on the 17th of December, the height of the flood was 7 ft. ; in 1823, 6 ft. 9 in. ;

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*Mr. Taylor.*

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Chairman—continued.

in 1824, 5 ft. 9 in.; in 1828, 5 ft. 8 in.; in 1831, 5 ft. 10 in.; in 1841, 5 ft. 7 in.; in 1848, 4 ft. 10 in.; in 1851, 3 ft.; in 1852, 6 ft.; in 1854, 3 ft. 6 in.; in 1856, 2 ft. 9 in.; in 1859, 3 ft.; in 1860, 3 ft. 10 in.; in 1861, 3 ft. 11 in.; in 1862, in April, the same; in May it had subsided to 2 ft. 8 in.; in 1866, on the 17th January, it was 4 ft. 3 in. I believe either at Christmas 1865, or in January 1866, we had a tremendous fall of snow; it was so heavy that the weight of the snow upon our roof, which covered three rooms, like the Brompton boilers, caused the whole roof to fall in. We dread a flood more after a quick thaw from snow than we do from rain; it comes so rapidly just like the Thames tidal floods. In February 1866, it was 3 ft. 11 in.; in 1867, 4 ft. 4 in.; in 1868, 3 ft. 4 in.; in January and in December the same year, 3 ft. 3 in.; in 1869, 4 ft., and in 1872, 4 ft.; in 1873-4 ft., unfortunately, neither Mr. Curtis nor Mr. Holgate took a register of the flood, but it was very high indeed that season. There was another deep fall of snow about Christmas-day, and that flood did not go away until January. It was 3 ft. 2 in. on the 27th of January 1875; on the 18th of November, 5 ft. 8 in.; in December 1876, 4 ft. 8 in.; and in January of the present year, 5 ft. 9 in. Mr. Holgate did not take so many years, but they correspond with Mr. Curtis's in same times  $\frac{1}{2}$  of an inch, or  $\frac{1}{4}$  of an inch, and so forth. I think the Thames Conservancy say in their report that they have only had four floods since 1821. If you look at this there are upwards of a dozen very high floods, and every one of those floods that I have read to you were disastrous, more or less, to certain property, houses as well as land.

10. And this year there have been two floods?—December 1876 and January 1877.

11. And again in March?—That was nothing very particular; we got over that very easily. In all those floods that I have read to you many streets, many cottages, and many cellars in Staines, which are very few, because of the flood, were under water, everything floating about. I saw a gentleman last night, Mr. Harris, the brewer, and he told me that they had spent 300*l.* in repairing the damages from floods, and this last year it cost the Linoleum Company upwards of 450*l.*, and that was more for prevention than cure. If we had not done it, the loss would have been some thousands to us; but last year our loss amounted to nearly 300*l.*

Mr. Walter.

12. Would you state at about what height you consider a flood to be serious?—I observe that they range from four feet to six feet. I do not think that it is of very serious consequence to us if it is two feet; it would harm us, but nothing of any consequence to the parish or to the land.

13. Anything above two feet you consider serious?—I think you might safely say that with a flood of four feet there would be a great deal of damage done; for instance, there is a large area of arable land, and when they come to manure the lands and sow the corn, of which, I believe, much was done before the last floods, the damage must be tremendous; and if we had any flood equal to that of 1821, the consequences would have been most disastrous.

Mr. Richardson-Gardner.

14. I apprehend that you allude to Staines only?—What appertains to Staines appertains

Richardson-Gardner—continued.

to a great many miles on both sides of Staines, because Staines is almost level with Wyrardisbury Datchet, &c. The repairs of the roads of Datchet, after this last flood, from the washing away of the gravel, came to 61*l.* this year, so I was informed by information obtained from the surveyor the other day.

Chairman.

15. What is the next head that you wish to mention?—I have given it under various heads, and the first is with respect to the extent of the floods.

16. With regard to the extent of the floods, will you give such evidence as you are provided with on that point?—I have spoken of the cottages and cellars, and speaking of them generally, hundreds of them were under water, and subscriptions were got up to assist the poor people. I think the expenses of the local board of Staines this last flood, merely in the hire of boats, and putting down planks for people to go over, for the poor people to get to and from their work, was upwards of 100*l.* I remember being told of a funeral occurring, and the corpse being taken from a gentleman's house in a boat to the road leading to the churchyard, but that was some years ago. The destruction of crops in the cottagers' gardens every year is a very serious item to them; my own seakale for instance was perfectly rotted by the floods, and that is the same with a great many other people in Staines. I live some distance from the Thames I must tell you.

Sir Charles Russell.

17. What distance should you estimate you are from the Thames?—As the crow flies, I should think between 200 and 300 yards, but the Colne runs through my garden and empties itself into the Thames, but we are not flooded by the Colne at all; it is the water oozing up through the gravel that comes into my dining-room; it is such a porous soil that it oozes up and gets into the cesspools and wells, which then overflow. In a sanitary point of view, these floods are of as disastrous a character as anything else, and of course serious epidemics must arise.

18. As regards the sanitary point of view, have there been any cases of low fever arising from the floods?—That will come more in the summer when the sun pours upon the refuse that is left, and it will have a serious effect upon many persons no doubt.

19. To your own knowledge have such cases occurred which are traceable to the floods?—I do not like to say yes to that, but before the local board those cases were constantly reported; I do not know last year whether that was really considered so or not, but I have no doubt in my own mind that it is traceable.

20. What is the next point?—I have a letter from Mr. Mackenzie, who is a very large land-owner at Gillotts, near Henley-on-Thames, and a member of our association; he writes me and says, "The recent floods have done very serious injury to the banks of the river in many places; in one place above Henley a bit of the tow-path has fallen in completely, leaving a dangerous gap. It will be, I think, necessary to go into the adjoining field to carry the tow-path, the water being very deep at the spot." "The river has encroached more the last few years



*Sir Charles Russell*—continued.

years than for many years previously." The same gentleman writes again, on 5th February 1877, "Floods frequently arise from the neglect of the conservators to keep the locks in order. In 1875 crops of hay ready for carting were entirely swept away, and the cause was solely and entirely that only one or two of the sluices at Mill End Lock were open (they do not open the lock as they ought to do). When, however, some of the others were opened, the flood went down 12 inches in one night," clearly proving that if they would open the sluices in anticipation of floods, we should not have these floods." "The farmer could not recover anything by way of compensation from the Thames Conservators." The mills in many cases are the sole reason for damming up the water; could not they be bought up?" I think that is all I need trouble you with as to the extent of the floods; very likely other gentlemen will give you more information.

21. Are you of opinion that the Thames Conservancy have neglected to keep their locks in order, and that they have neglected to open them in times of flood, when by doing so the floods might have been modified?—I will not say that they have neglected to keep their locks in order; but on the last flood, I think that was on the 17th of December of last year, I went with Mr. A. W. Rixon to Penton Hook, that is just about a mile from Staines; we were in flood at the time, and the water on the other side of that lock on the day I went down there, Wednesday, was two feet lower than it was in the lock. I went down again on the following Sunday, and it was 18 inches lower. I went again on the Wednesday, and it was all level. I went into the gatehouse and asked the gatekeeper why she did not open them and let them out, and she said she could not. I was quite aware of that; but if they would apply hydraulic pressure to those gates of course the gates might be opened.

22. On the occasion of a deputation waiting on the Thames Conservancy, I think you stated that the floods were out considerably at Staines?—Yes.

23. And a member of the Thames Conservancy appeared somewhat surprised at your statement?—I think that was the fact which I was just telling you of, namely, Penton Hook.

24. Penton Hook is between Staines and Laleham, is it not?—Yes.

25. After having stated this, which seems to have taken the Thames Conservancy by surprise, did you notice any change the following day?—The floods went down very rapidly after our deputation.

26. How much?—They had gone down considerably before we had that deputation.

27. But was it before or after the deputation?—I forget the date of the deputation; I think it was in March; and the floods were in January.

28. Did you notice any change the following day?—No, I cannot say that I did; except from Teddington Weir or Bank having burst in January, when the water went down at Staines two or three inches in one night.

29. You cannot trace it, in consequence of the deputation waiting upon the Thames Conservancy, that the locks were opened?—No, not from that deputation, because the floods had subsided. When we went to the Thames Conservancy there were no floods like those in the previous January; but still many lands were then flooded.

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*Sir Charles Russell*—continued.

I forgot this when you asked me the question a few minutes ago; but I wrote to the Thames Conservancy, and this is their reply, detailing what I have told the Committee just now about those gates not being open; their reply is on the 20th of December 1876:—"In reply to your letter of the 8th instant, I am directed by the Conservators of the River Thames to inform you that the whole of the tackle at the tumbling bay at Penton Hook Lock were taken out for the escape of flood water three weeks before the date of your letter; and, further, I am to state that if by the word 'slides' is meant the gate sluices, it is practically immaterial whether in so large a flood they were open or closed" that is where we disputed with the Conservancy; "and with respect to your suggestion for forcing open the lock gates, I am to add that to do so would be extremely hazardous, as the lock was not constructed to admit of that being done, besides which it would prematurely stop the navigation. (Signed) *E. Burstal*, Secretary." There is no doubt of the truth of that letter; but what we contend is, that they ought to make them strong enough to open both locks together. I believe it is simply a question of expense with the Thames Conservancy. I believe they are willing to do anything they can, if they had the funds.

30. Do I understand from that letter that the Penton Hook Lock would not open?—They cannot open the two lock gates together at flood time; it is impossible, unless you have hydraulic pressure to lift them; they would have to be entirely reconstructed. In France it is done; they have got hydraulic pressure, and they can open both gates at once; therefore, there is nothing to obstruct the flood flowing from the one to the other, and if they do it in Paris they could do it on the Thames; it is simply a question of expense, and if this power was applied and used in anticipation of floods, I do not think we should have any floods at all.

*Mr. Richardson-Gardner.*

31. They would raise them?—Yes, that would be the best way, but by hydraulic pressure they could open them.

31\*. But it would be much easier to lift them by hydraulic pressure than to open them?—I should imagine so, but I am not an engineer.

*Chairman.*

32. What is the next point which you wish to give evidence upon?—The reasons why the floods are materially increased. In former years we had no railway embankments. The railways have made a great many more bridges, and every one of these are obstructions in the case of floods such as we have had; the railway embankments particularly. It is not only the embankments, but it is the banks close beside, and the water that used to get away on to the fields is now stopped by those embankments, the same as it is at Datchet; two bridges being made there over the road, and there is a railway bridge over the river at Staines, where it was a free course at one time.

33. Have you any other reasons?—Badly constructed bridges, such as at Chertsey. I suppose the Thames Conservancy would be very glad to get rid of that bridge; it stops the water and causes a flood; flows all over Lord Lucan's land; it is a most hideous bridge, and a great obstruction.

*Mr. Taylor.*

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Chairman—continued.

obstruction. There is another thing, the silting up and the deposits of mud, which is not attended to, and I think the Conservancy might attend to this, and get rid of the deposits; it is a lot of mud accumulating with the osier-beds and so forth, preventing the stream from getting away; it makes a tremendous deposit in the beds of the river, particularly so at the last flood. At Staines a very fine bridge with several arches exists, built by Rennie. I stood on Staines Bridge during the last flood when two arches in that bridge were comparatively dry, which was simply caused by obstruction of the deposit and the osier-beds, which divert the stream. At this particular point the Thames Conservators, I believe, have made a tow-path, which prevented the water getting through one or two of the arches of the bridge at Staines, one of them being used for a boat-house. At Staines you could see on looking up the river that the flow of the river came down at a tremendous pace, and the great bulk of it went through two arches leaving a great many arches comparatively dry; if the bend was straightened and a little cut made there (I think it must be their own property) the water would run through as well as I am told it did in former times.

34. Do you consider that this tow-path impedes the flow of the river?—There is no doubt of it, but only in these extremely high floods; it would not on an ordinary flood. There is another reason, and it is a very important one, I think, which is the meandering of the river in so many places. You see the course that it takes on the map, and these, of course, must be tremendous obstructions.

35. And if any public body were to undertake to check the floods, you think by straightening the bed of the river, the floods would be reduced?—They must be, but the Conservators ought to take out a good deal of ballast, and dredge the river much more.

36. What is the next head?—As to the jurisdiction; you know the jurisdiction of the Thames probably better than I do, and I need not speak upon that.

37. Are you aware that in 1857 an Act was passed by which the jurisdiction of the Thames passed from the Corporation of London to the Thames Conservancy?—Quite so.

38. To what extent of the river was that?—I think it was from Cricklade to Yantlet Creek.

39. I think you will find that it was only from Yantlet Creek, which is near Sheerness, to Staines?—I thought it went to Cricklade.

40. Then in 1864 are you aware that the jurisdiction of the Thames Conservancy extended up to Lechlade?—I thought it was 1866 that it extended to Cricklade. I think up to that time the Lord Mayor used annually to go to Staines Stone.

41. In 1864 I think you will find that the jurisdiction of the River Thames Conservancy extended from Yantlet Creek to Staines, and in 1866 there were further powers given up to Cricklade, which is 40 miles above Oxford?—Yes, I think up to that time there used to be an old ceremony of the Corporation. Just before the Lord Mayor took office he went down there to be bumped at the Staines Stone, and my brother-in-law, the late Sir James Duke, was the last Lord Mayor who was bumped there.

42. And further powers were given to the

Chairman—continued.

Thames Conservancy to keep out pollutions from the water from the river also in 1866?—Yes, by the same Act, the 29th & 30th of Vict. c. 89, and then the upper Thames from there, I think, was vested in certain Riparian Commissioners. I am not quite clear about that, but I think I am correct in stating it. How they were elected I do not know.

43. Have you any suggestions to offer to the Committee as regards an alteration of the Thames Conservancy by which means these floods might be more quickly looked after and more easily remedied?—Upon this head I would state the origin and the constitution of the Thames Conservators as regards the upper river. At the time that the Act passed through Parliament, it was really, I will not say smuggled through, but no one took much notice or knew what it was about. It was looked upon as a purely Navigation Act, and the great fault that I find in the Thames Conservators is, that they look more upon the Thames for purposes of navigation than anything else, and they neglect the floods. At that time a great number of people had fishing rights on the river, and not knowing what was going on in Parliament they took no notice of it, and they have lost them entirely; but one gentleman somewhere considerably above Staines saw it, and he interfered before they had the Act, and I believe that he did maintain his fishing rights, and has them to this day. I believe he is the only man on the river now who has those fishing rights, which he preserved as he threatened some opposition to the Bill.

44. But in 1866 it appears that the jurisdiction of the Thames Conservancy applied principally to navigation, but with the additional power of preventing the water of the river being polluted?—Yes, that is so.

45. They do not appear to have had power given them to prevent floods?—No; they have not the power of rating, and they have not the means of doing it. When I am speaking of the Thames Conservancy, I do not want to say anything at all in reproach, but really they have not the money to do it with, and no power to get it.

46. Have you anything further to add as regards the jurisdiction?—No. The next matter I have put under the head of representation. I think that the Thames Conservancy comprises four elected members, perhaps they will say five, and 18 others, whom I cannot call self-elected, but they are nominated, and we in the valley have no voice in the matter; you may call them nominees.

47. What is the number of the conservators of the Thames?—Twenty-four. As I say, there are only four of them elected, and there are two nominated by the Board of Trade. I remember at one of our meetings, Colonel Harcourt, the acting chairman of the Thames Valley Drainage Association, which has jurisdiction from somewhere near Abingdon higher up the Thames, referred to this very subject.

48. The Upper Thames Drainage Commissioners they are called, are they not?—Colonel Harcourt is the acting chairman of the Thames Valley Drainage Commission. I believe he was one who was elected on the Thames Conservancy, and he stated at one of the meetings that he was so disgusted at those meetings; he was always out-voted, that it was a mere

*Chairman*—continued.

mere farce any of those four attending the Thames Conservancy meetings, because they could not do anything, and they never brought forward anything that they were interested in without being out-voted. What I maintain is that the entire valley of the Thames from Teddington ought to have a voice in the matter. You see we are taxed, and are going to be taxed tremendously, divert to our sewage from the river principally for the purpose of giving good water to the waterworks of London, from which the Thames Conservators derive a considerable income. If we are taxed to that extent, we ought to have some voice in the election of the conservators to a greater extent than we have at the present moment; in fact, we ought to have a larger number of representatives upon the Conservancy, so that we should be adequately represented, and not out-voted entirely by the others.

49. Has your Association considered the question as regards the constitution of the Thames Conservancy as to what would meet the views of those interested in the property in the Valley?—

50. Have you any suggestions to make to the Committee upon that point?—Only to that we should have larger representation, such a representation that we should not be always out-voted by the lower Thames. We look upon the Thames Conservators as merely representing the lower Thames below Teddington, that is the tidal part.

51. Do I understand you to suggest that the owners of property above Teddington should have a voice in the Thames Conservancy?—Quite so; that would give the classes a voice in the amount levied. Perhaps I may be allowed to read a very short extract from the "Saturday Review" upon that question, which embodies my own view, "The Thames Conservancy should be really a representative body, in which every town council and every board of guardians having jurisdiction in the district liable to floods should have its fair value; when the necessary outlay came to be spread, over this larger contributory area, it would cease to be so appalling as it may well seem when it is regarded as imposed upon a single class." I think that represents exactly what I have been stating.

52. Can you suggest to the Committee any public officials whom you think it would be desirable to add to the Thames Conservancy?—I have not considered that point.

53. Would it be desirable that the chairmen of the sanitary boards of important towns along the river should be added to them?—I would rather have them elected, than just name them, merely because they are chairman of boards; many in villages are incapable to fulfil the duties of a Thames conservator. In towns sometimes politics run very high, and the chairman so elected may be a very unfit representative.

54. And you would therefore suggest that the representative should be elected?—I think so.

55. Have you at all considered how many would duly represent that part of the river which you say at present is unrepresented?—I think, if there were an equal number representing the Upper Thames Valley, and the Lower Thames, it would be fair, and I would let them appoint their own chairman.

56. When you speak of the Lower Thames, 0.114.

*Chairman*—continued.

what is your line of demarcation, would it be Teddington?—Yes, all the tidal water that is up to Teddington.

57. You are of opinion that if an equal number of members above Teddington were elected with an equal number below Teddington, that would constitute a Board of Conservancy, which would be satisfactory to all those who are interested in property adjoining the Thames in the upper waters?—Yes, I think so; it ought to be satisfactory to them at all events. Certainly their interests are so very different, the one from the other, that I do not wonder the one should try and out-vote the other.

58. Have you any further suggestion to make upon the alteration of the constitution of the Thames Conservancy?—I think not. The next point that I come to is under the head of management. I think, as Mr. Palmer suggests in his book, that there should be telegraphic communication from lock to lock, which could easily be done, and the lockkeepers could easily be instructed in the use of it. The telegraphy would be of immense service in anticipation of floods, as it could tell them exactly that now the flood were in such and such a place, and they could communicate from one place to another as to the time of opening the weirs. I am quite sure that if the gates were opened in anticipation of floods rather than waiting, as they do now, until the flood has come, a lot of water would escape. We had a great proof of that in the last flood, when some bank or other burst at Teddington. I think there was 12 or 14 inches of water in the market place at Kingston-on-Thames, and in 12 hours after the bursting of the bank it had all gone away. That shows that if there was an escape for the water, the floods would be considerably remedied.

59. Are you of opinion that with more supervision of the locks in anticipation of floods, the floods might frequently be mitigated, if not altogether prevented?—They might be mitigated very much. Then, I think, that this new representative Board that I have suggested if separated from the present Board should suggest to the general Board, various things as to navigation, and drainage, and so forth; and, in fact, they should take the initiative in the upper river, and report to the full Board; and in case of disagreement it might be referred to the Board of Trade or to the Home Secretary, perhaps, for decision. As illustrating my meaning, I have two or three extracts from a letter from Mr. Kent, of East Moulsey, of the 12th of January this year.

60. Is that evidence which you can give us as your own?—This is a letter from him to me; I cannot endorse the facts, but from what I have seen at Staines I have no doubt that it is the fact.

61. We are now examining you as the honorary secretary of the Thames Valley Floods Prevention Association, therefore we cannot go into extraneous evidence from other people?—I could not endorse them, because those are things which he has seen at Moulsey; but as the same things occur at Penton Hook, I think it is very probable.

*Mr. Samuelson.*

62. Do you know this gentleman?—No; I only know him by name; I have never seen him.

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63. I do

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63. I do not think then that we need trouble you to read his letter. Is there any other improvement in the management of the river which you would suggest to the Committee?—I have a statement here from Mr. Chamberlain, one of the aldermen of the corporation of Windsor, in which he suggests, "The discharge of superfluous water must commence at Teddington, with a system of discharge at each receding tide." Exactly as I have suggested, "Some floodgates placed on that weir, capable of being lifted when required, would answer every purpose, only they must be put in operation at the beginning of the wet season, and all locks above Teddington regulated by the discharge;" which confirms exactly what I have been suggesting. I think, that in that letter of Captain Burstall's which I have read to the Committee, he confirms it also. He says that it would stop the navigation; but, as I say, the same power which would open the gates, would shut them when the water was getting low, and thus effect the object we have in view. I think that the importance of the navigation ought certainly to be kept in mind, for I am strongly of opinion that before long the railway conveniences are getting so heavily taxed, that the navigation of the Thames will become very important. The main navigation a very short distance above Richmond is of very little consequence now, because they do not dredge the river, and it is not deep enough; in fact, the navigation of the Thames is reduced almost to a minimum. I think that the income is only something like 3,000*l.* to 4,000*l.* a year, and that is chiefly from pleasure traffic derived from and those little boats and steamers which one sees on the river, which of course is not of very much importance. But if the river was dredged and deepened from London to Reading, depend upon it, it would be a great source of income to the navigation. I presume it is entirely from the want of funds that the Thames Conservancy have not done it, I am surprised they have not done this because they can always sell their ballast and sand; and the greater part of the sand along the river is most valuable for building purposes.

64. You anticipate that the tolls on the river, owing to the blocks on the railways, will eventually increase?—I think so, if the river is deepened. It is of no use at present, because they cannot navigate it. I think the drainage is of great importance, because the quantity of land drained now is increasing very rapidly, and if the water drained from the land is to flow into the Thames, I am afraid that by-and-by from the narrow channel, and the depth of the river, the overflow must and will increase and go on to the banks, instead of flowing down the river.

65. Do you suggest that the drainage of land should be checked in any way?—No, I think not.

66. You are of opinion that that would be impossible, and that the tendency would be rather for the drainage to increase?—Yes, I think that it will increase, particularly when the Thames Valley Drainage Association have got into full work, which they are not at present. They are to go on from above Abingdon, and I think that when all this drainage is increased, an overflow must ensue. Provision should also be borne in mind for irrigation purposes, and in some places, people having their land benefited, should pay for that irrigation.

Chairman—continued.

67. What is the next point upon which you would wish to give evidence?—I think that power should be given to deal with, and regulate the tributaries of the Thames as to the intake of the mills, and compel them to clean them out. The various ditches are in a frightful state, and if they were cleaned out it would enable the water to get into the Thames better. There should be power given to them also to clean out the bed of the main stream of the tributaries to the Thames as well. There have been immense deposits in the Thames in former times, such as deposits from the land, manure, and various other things.

68. Can you trace any injury in the way of floods from any neglect of the mills?—I have not had much experience in that respect.

69. You have suggested that power should be taken by the Conservancy to control the tributaries and the mills upon them?—Yes, the intake of the mills; I would not let the mills do as they like. There is no doubt that they do take great liberties from what I have heard.

Mr. Samuelson.

70. In what way?—They do not attend to them; they will keep back the water when it is necessary, and they will let it out when they choose. I can give the result in our own case. There are two branches of the Colne which go through Staines; one branch belongs to the property that I am interested in and is under our control; but in the case of the other, in order to get rid of the floods coming through their mill-stream, the mill proprietors positively cut the bank in two places, from which the water got into our fields and overflowed our land. Of course I gave them notice that we should hold them responsible for all the damage done. They had no power or convenience to repair the gap made, and we sent our own men to do it.

Sir Trevor Lawrence.

71. Was it the bank of the river that they cut?—Yes.

Chairman.

72. On property not their own?—No; it was the bank of the River Colne; they had merely the right of the stream; that was done at the last flood, and it helped to inundate my house and land.

73. What is your next point?—I next come to works to be executed. As I have said before, I think that dredging should be more systematically attended to. I am afraid that the dredging is done where they can get the best ballast. I think the Thames Conservancy sell a great deal of ballast to ships, and of course they will not take mud. There are great holes at Staines left where it has been ballasted, and then you come into shallow water.

74. You were going to tell the Committee of the works which you think ought to be executed?—Dredging is one. Then there are a good many curves as you can see on the map, which might be straightened at a very trifling expense, by making short cuts, such as at Penton Hook, which is a very excellent place for one; there is only, I think, a distance of about 60 yards, and a cut made there would tremendously relieve us at flood times. There is another place just before you come to Staines Bridge, between Egham and Staines, and there are dozens of places all up the river;

*Chairman*—continued.

river; any one going on the river can see them at all points. There is another at Ankerwicke. These are very short ones, but they would save a tremendous amount of flood, and moreover, enable the flood to get away more quickly. The straighter you get the water to flow, the quicker it will go away.

75. Are there any other works that you would mention?—Yes, the weirs might be made wider and deeper, and the rymers continued deeper down the river; I should have said sills, and if the sluices were wider, there would be a greater surface for the water to get away.

76. Are there any other works which you think ought to be carried out?—The sills should be lowered, and tumbling bays might be made. I believe there is a very good tumbling bay at Windsor, which is very effective.

*Sir Trevor Lawrence.*

77. Can they keep a constant current through the locks?—Yes.

*Chairman.*

78. Can you suggest any other works?—I believe the most important thing would be this, although it would be attended with considerable expense, and that is to apply hydraulic power to the lock gates, so as to open both lock gates at once; I am quite sure that if that was done we should have no floods, that is if they were opened in anticipation of floods. The same power that can open those gates could close them.

79. Is there anything further?—Straight canals might be made in many places; that would be rather too expensive a thing. To make one canal from Reading to Windsor, and another from Windsor to Brentford, might cost four millions of money. That might be too costly, but no doubt it would be an effective cure. You will remember that Mr. Leach, at the deputation in reference to this question, distinctly stated, without hesitation, that the damage done by the floods could be remedied, and that it was merely a question of expense.

80. Have you anything else to suggest in the way of works to be executed?—No. It is a question whether this should be done by the present Thames Conservancy, or others, after having the power of taxation and so forth. I will go on now to finance and taxation.

81. You have told us of a number of works that require to be executed; you now wish to provide the ways and means?—Yes; I think that that is very important indeed. I think that the revenues and expenditure of, if I may so distinguish them, the Upper and Lower Thames, by which I mean the tidal and the Thames Valley portions, ought to be kept as separate accounts.

82. Teddington being the point of separation?—Yes, with this exception, that, I think, that the revenue which the Conservators draw from the water companies ought to belong to the Upper Thames, that is, to the Thames Valley, because of the enormous expense which will have to be incurred, amounting to some millions, for their sewage, for the purpose of providing them with pure water. If we have to pay that money to provide the London water works with pure water, we ought to have the income derived from it, which I think amounts to 6,000 *l.* a year. We have to keep the water pure for that purpose, and therefore I think we ought to have the

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*Chairman*—continued.

revenues of it, and that the money should be expended upon improvements in the Upper Thames.

*Mr. Samuelson.*

83. Who has to keep the water pure?—The Thames Conservancy have the power of compelling all that throw sewage into the Thames to divert it. We have a notice at Staines to do that now within the next six months, and it is for the purpose of having pure water for those water companies.

84. You mean that the towns have to divert their sewage?—Yes.

85. And therefore the towns should have a share of the revenue?—Yes; throughout the whole valley up to Richmond and Teddington we do not know how to get rid of our sewage. The Thames has been the receptacle of our sewage hitherto; we have got rid of it through the Thames before; but we have only six months now allowed to divert it. In fact, I think that all receipts, from whatever source they come, in the Thames Valley should be applied to the improvement of the Thames Valley, whether derived from locks, navigation, or anything else. Another source of income would be the charges which should be made for irrigation. I think Sir Gilbert East would not object to it, although I think he wrote a letter to the "Times" saying that he objected to the floods being done away with, because it improved his land very much, it being grass land.

86. All the tolls in the upper part of the Thames you think ought to be credited to the upper part?—Yes, quite so; all income whatever should be expended therein. The money might be raised by a loan and paid off by a sinking fund, and then I think the Government might help, the Thames being of national importance.

87. Do you say that the amount for the necessary outlay should be raised by a loan?—Yes.

88. Have you any further suggestion to make?—That the Government might lend it at a low rate of interest, for it is a matter of public interest, and all deficiency should be made up from taxation on the land.

89. You mean by rating?—Yes; land, houses, and sanitary authorities. But to apportion the latter it would be necessary to have a plan showing the flood levels and the drainage affected by the floods. We all know that the porous strata of the Thames Valley is something very great.

90. And you do not anticipate any difficulty in limiting the boundaries that should be rateable for this deficiency?—It would require great consideration as to what the boundaries should be. I think whatever is affected by the floods should be rated, because every one living near is affected as well as those immediately affected by the flood, for they pay poor rates, and the poor rates are increased in consequence of the floods and various other things, and our wells are affected. I have a letter from the Henley Local Board, in which they say that they are quite willing to subscribe in order to secure the appointment of a sound practical engineer to consider and advise what is necessary to be done.

91. Have you applied to all the authorities?—No, those communications which I have received are voluntary. I have not applied to anyone of them. What I have read from the Local Board of Henley was in answer to my

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*Mr. Taylor.*

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notice

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notice, asking them to attend our public meetings. The Rector of Iffley writes me to say, that it was decided at a vestry meeting on 29th March 1877, that "the parochial authorities would be willing to co-operate in any movement for mitigating the evil."

92. Will you tell us what local boards have expressed their willingness to be rated for the purpose of meeting the deficiency?—I have not asked this of any. The Staines Local Board passed a resolution to solicit support to our association.

23. As honorary secretary, do you anticipate an objection to be raised on the part of the local authorities to be thus rated?—If I may give my own experience of local feeling, I think that they would object to be rated for anything in the world; and I will give you my reason for saying so. I was two years endeavouring to get a fire escape for Staines. I succeeded in begging it from the Royal Society, and the only condition made was that we should find a house to keep it in, and a brigade to work it. The vestry refused to provide this till Mr. Thomas Ashby and myself agreed to put the building up at our own expense; and, further, that we would guarantee the expenses. Mr. Ashby and I entered into an agreement to guarantee the expense of the fire brigade for 10 years. I think that when a vestry will not accept such a gift as that, you may anticipate that they will object to anything.

94. Have you any other points to bring before the Committee?—I think that the amount of taxation necessary will bear no analogy to the damage done by reason of the floods. We have heard various estimates of the taxation necessary by reason of improved drainage. I am afraid that those floods will be a chronic evil if something is not done.

95. You believe that those who are rated will be very fully compensated for the payment of the rate by the advantages which they will receive?—There is no doubt of it whatever; I think that we are the largest rated property in Staines, and we should not object; and I know that other large ratepayers are equally willing to be rated.

96. Have you anything else to state to the Committee?—I think that the necessity of dealing with the difficulty promptly, and the numerous detailed works that are required, render compulsory powers desirable. It is a question whether the Board of Trade should not be authorised to settle the amount of compensation, in fixing which, the injury done to the proprietors should be taken into consideration. I thought that if an extended jurisdiction were given in the case of any disputes, the Railway Commissioners might be a reasonable body to adjudicate in the matter, as they would do it quickly. There is only one more thing which I wish to suggest, and that is the consolidation of the present Acts; I have never read the Acts, but I am told by a solicitor that their powers are very conflicting. It is a question whether they should not be consolidated, and a consolidated Act substituted.

Mr. Walter.

97. When you speak of a flood of six feet or any other depth, what do you mean exactly by the expression; above what datum?—Whatever

Mr. Walter—continued.

will flood over the banks; that of 1821 was six feet above the banks.

98. You mean six feet above the top of the bank?—Yes.

99. Have you any knowledge of the ratio of the area of the flooded ground to the sectional area of the river; that is to say, what depth of channel or what height of bank would be required to represent the amount of water that would pour over the adjoining country in case of flood?—Not at all; that is an engineering question.

100. Have you any knowledge of the ratio between the rainfall in the particular years to which you have referred and the floods in those years?—No; but there is a table in Mr. Palmer's book which gives you the rainfall.

101. Do you know whether it has been reduced to a certain calculation?—I do not know at all.

102. With regard to the bed of the river, can you state whether or not the bed of the river has silted up perceptibly since the year 1821, the first year of the great floods which you have referred to?—I cannot give you that, but the silting of the river is considerable, I should think.

103. Can you state whether it is not the fact that the weeds have increased material<sup>y</sup> in that time?—I have never watched that.

104. They would have the effect, would they not, of preventing the escape of water?—There is no doubt of that, but in the tributaries to the Thames the millowners take care to cut those weeds; but we, who are on the large tributary, the Colne, had the Thames Conservators down upon us, and they requested us to stop the cutting of those weeds.

105. On what ground?—We asked them for that, but they could not show us any authority; and we cut them still. We should have no water to supply our mills with if we were not to cut down those weeds, which are brought down perhaps 20 miles to us. I am told that they are going to apply for power to stop the mills from cutting the weeds in those tributaries, because this mass of weeds (it must be a great nuisance to the Thames Conservators) gets into various places, and blocks them up necessarily.

106. Have you no means of turning them out?—No, except floating away with the stream.

107. With regard to the suggestion for making short cuts between the bends of the river to carry off the water, has your attention been called to the point between Abingdon and Ridges Weir, which you see upon the map between Abingdon and the head of the river that is at Clifden?—I do not know the neighbourhood at all.

108. Do you know what would be the distance, and what would be the expense?—I have not the means of giving information. I have not gone into any of these points. I think that would be an engineering question, upon which Mr. Leach could give you all information, I have no doubt; he is a very able man to do it.

Sir Charles Russell.

109. You told us that you were obliged to go to the brewery well for your water; how is that well supplied?—There is a very deep well, and they allow us to fetch the water from it.

110. If the surrounding country is so porous and filtrated through, as you say, does not that well get filled with Thames water?—No; I believe they have taken means to prevent that; being a large brewery, they are obliged to prevent it;



Sir Charles Russell—continued.

it; but that brewery yard was one sheet of water, and half the yard was filled with water and many barrels floating about during the last flood.

111. Have you any idea what distance from the river itself this filtration of the water is taking place?—I do not know; it is all gravelly soil, so that it must filtrate into and through the wells.

112. In the event of rain falling either in the tributary of the Thames, or higher up in the Valley of the Thames, if your scheme of telegraphic communication were put in practice, I presume that the very instant the rains began to fall, the telegraphic communication should go to Teddington to open all the gates, and so on?—Yes; I would send to the next lock first, and pass it on to the next, and so on.

113. Would not the easiest way of clearing the channel be to begin at the bottom and work upwards?—It ought to be.

114. Do you believe that the mills are supplied with enough gates, or with sufficient tumbling bays as a rule; do you know whether that is the case with any of the mills in your immediate neighbourhood?—I could not speak to that directly. In our mill, directly there is an anticipation of a flood, we burst everything out, and take the gates bodily away. We have never put the gates up now since last November; we cleared them out entirely.

115. With regard to your scheme of the lock gates being both opened at the same time, could not the paddles which they raise to let the water in and out, and the locks be raised at both gates and kept up?—By winding up I should think they could.

116. Supposing that the upper and the lower gate were wound up and kept wound up, would not that allow a very considerable amount of water to pass through in 24 hours?—I should think so. I am not aware whether there would be any engineering difficulty; whether it might not burst the gates, but if that was done it must relieve the water.

117. With regard to the weirs, is it not the fact that many of the weirs are in charge of women?—In the very instance that I have been telling you of the weir is in charge of an old lady at Penton Hook Lock. I asked her why the gates were not opened at Penton Hook Lock, and she said her son was gone away for a holiday, and the only reason she could give me at a moment for not doing it was that her husband who died at 80 years of age, said it was of no use, and the floods could not be prevented, for her husband told her so; she is herself getting on to 80 years of age.

118. Is that lock at Staines?—At Penton Hook; about a mile from where you see Staines mentioned on the map.

119. Is there any weir close to Staines?—There is the Bell Weir at Egham.

120. Is that kept by a woman too?—I think it is very well attended to.

121. I am told that in several cases they are kept by women, and they did not open their paddles because it would wet their boots if they were to do so?—Very likely.

122. If there was any control placed upon the tributaries, do not you imagine that it would very materially lessen the floods in the Thames at the same time, when it reaches the lower body of the Thames, preventing the overflow of water being passed through the tributaries, or

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Sir Charles Russell—continued.

*vice versa*?—I am not sufficiently acquainted with the river, but judging from our own case, if they were to do that we should be flooded worse than we should be from the Thames. That is why we burst open our gates and let all the water get away as quickly as we possibly can, because immediately in front of my house is the backwater of the Thames, and it empties itself into it. But my flooding is not from the Thames water, but simply from the oozing up from the gravel.

123. That is caused by the height of the water in the river, which naturally forces up the oozing and causes you floods?—Yes, quite so; if it came only in directly from the Thames it would never affect me.

Sir Trevor Lawrence.

124. In fact, it is the general rise of level of the water during the rainy season of the year that affects you, and not the outflow from the Thames?—Quite so; but if the water could get away from the Thames quickly, we should never be flooded.

125. Is it the case in all river basins that at certain periods of the year the general level of the water rises?—Yes; only this might be got rid of at Teddington, as was proved at Kingston-upon-Thames, where in 12 hours the water went down several inches.

126. That was because the water at Teddington had overflowed the river bank?—Yes; but if Teddington Weir had been sufficiently open and had let the water get away, it would not have been over the ground; that is my theory. But they must do it in anticipation of floods; it is no use waiting until the floods come.

127. You say that the water in your well was not fit to drink; have you had it analysed?—Yes, I have had it analysed. We sank several wells all round our works, and I had the water of four of those wells specially analysed, and each of them was worse than the worst water in London.

128. Is not that water which you say is not fit to drink the water which is supplied to the London water companies?—No; they get it from the River Thames.

129. But it gets into your well, as I understand you?—In floods the cesspools overflow into the wells and they get mixed together; it was undoubtedly so in my case.

130. How long have your works been built?—We bought them in 1863.

131. Did you know that these floods were likely to occur constantly?—I never dreamt of such a thing; I never was down there in my life before. We went there because there was a tremendous lot of machinery and cheap building, all ready for us, but we never dreamt about floods.

132. I understand that the tables you have got go back to 1821?—Yes, they do.

133. When you talk about epidemics, have you any knowledge of epidemics?—Low fevers.

134. Have there been any epidemics, as a matter of fact, from those floods?—I cannot speak to that, further than that I know we had small-pox; we had upwards of 80 cases in one season, but I do not say it was from those floods we suffer from low fevers.

135. Do you think it would be a reasonable proposal that the Government should have public money

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money for the purpose of improving the drainage of the Thames Valley?—Not for the purpose of improving the drainage alone of the Thames Valley, but I think the Thames is a national river.

136. Every river is national, is it not?—Yes, in a certain sense; I only say that they should lend it at a low rate of interest, and that it should be paid off by a sinking fund.

137. Do you find a difficulty in obtaining contributions towards the support of your association?—I do not think we should; I have got quite sufficient money to carry it on, but since it was taken up by the House of Commons I have not sought subscriptions, because I thought you were kindly doing the work for us.

138. If there has been a difficulty in getting the very small contributions that are necessary for the carrying out of the work of your association, would not there be likely to be a much greater difficulty if there was any question of your raising taxes which would have to be put on to carry out an efficient scheme of drainage?—For the reasons I have given you, I think the people who usually attend village vestries would object to pay any taxation; but I have had no difficulty in obtaining the funds for our association.

Mr. Samuelson.

139. You have stated that the floods are very much increased by snow; have you observed at all what are the ordinary intervals between the melting of the snow at any particular place, say at Staines, and the floods supervening?—Yes. Supposing there was to be a fall of snow at Oxford the flood would take pretty nearly four days before it reached Staines; that is, after leaving, if there was nothing between, it would take about four days getting down to Staines; but a fall of snow is generally all over the country; and the reason why we fear snow is not so much the continuance of floods, but it comes down so rapidly and inundates us at once, the same as it does near London, in consequence of the tides, but it is sooner over.

140. Is it the snow that falls in your own neighbourhood that causes the floods, or are they floods that come from the melting of the snow above?—Each will help the other.

141. To what do you attribute it chiefly?—It must be from that above, because as soon as it reaches Staines it is got rid of so far as we are concerned.

142. You spoke of the water, as I understand, from the river oozing up into your wells and cesspools; but does that take place only at the time of floods, or is it the case, more or less, when the water remains within its banks?—It must be more extensively so at floodtime, because the bed of the river at Staines is so much below the level of the ground that it gets away through the soil, and runs away into the river. You may now see water in all the ditches and gulleys on the railway where the bank is low, but many of these ponds, &c., are frequently dry.

143. There is a considerable difference, is there not, between the general level of the ground and the bottom of the river?—Considerable.

144. And if that is the case, you can scarcely say that you are inconvenienced at Staines by any deposit of mud in Staines?—No, in that respect we are not much.

Mr. Samuelson—continued.

145. What knowledge have you of those deposits of mud?—Only on the banks and osier beds stopping it; it accumulates there, at Staines and seeing the water in a tremendous muddy state at the time of these floods, it must come from the arable land.

146. You suppose that that mud is deposited, and thereby forming banks it prevents the water running off?—Of course, according to the rapidity of the stream, so much more readily the mud will get away.

147. You spoke of separating the accounts of the upper and lower Thames; are you aware what are the relative amounts contributed by each of those divisions, and what is expended upon each?—I have a letter from Captain Harcourt, the acting chairman of the Thames Valley Drainage Commissioners, in which he states that, "The Conservators receive for upper district purposes an income from the water companies of 6,000 *l.* per annum, and from the tolls of 4,000 *l.* per annum in round numbers; say, that in 10 years they will have received 100,000 *l.* of income on account of the upper river." As I stated before, it is nearly all pleasure traffic.

148. You say that they have received 100,000 *l.* in 10 years from the upper river; can you tell us what they spend in 10 years upon the upper river?—Colonel Harcourt says: "We find in the accounts of the Conservators published in 1876 the following items of expenditure amongst others for the upper river in 10 years; salary to superintendent, 3,037 *l.* 4 *s.* 7 *d.*; Conservators travelling expenses, 1,227 *l.* 5 *s.* 9 *d.*; surveyor, 982 *l.* 15 *s.* 5 *d.*; stationery, 779 *l.* 7 *s.* 3 *d.*; Conservators, personal allowance, 6,300 *l.*; expense of purchase and maintenance of plant of steam tugs, 5,272 *l.* 2 *s.* 9 *d.*; Salaries to lock-keepers and ferrymen, 13,239 *l.* 4 *s.* 6 *d.*; total, 30,838 *l.* 0 *s.* 3 *d.* On the other hand we find building and repairs of locks and weirs, 67,121 *l.* 16 *s.* 10 *d.*; dredging, 3,172 *l.* 2 *s.* 9 *d.*; total, 70,293 *l.* 19 *s.* 7 *d.* Thus, speaking roughly, 30,000 *l.* has been expended in doing 70,000 *l.* worth of work."

149. That is say, in administration?—Quite so; and wages, and the repair of all the locks and weirs.

150. Then it is hardly fair to say that 30,000 *l.* has been expended in administering 70,000 *l.*, if part of this 30,000 *l.* is for repairs, lock-keeping, and so on?—He goes on further, and he adds: "This proportion might be slightly reduced in favour of the Conservators, by adding repairs to towing-paths and locks, rents of ditto, and repair of bridges, 9,316 *l.* 17 *s.* 6 *d.*"; and he adds to that, "we will, therefore, assume that 80,000 *l.* of work has been done, and that it has cost 30,000 *l.* to do it." I think that is fair.

151. Even in that 30,000 *l.* the repairs and wages are included?—Yes, quite so.

152. Then that in point of fact would not be a fair representation?—He says that such management in private life would be considered simply ruinous, and so it would.

153. This is the case, that 110,000 *l.* have been expended upon the upper river, and 100,000 *l.* have been contributed by the upper river?—They have received 100,000 *l.* on the upper river.

154. And they have spent 110,000 *l.*?—Yes.

155. So that if the money was well spent, the upper river would have had no cause to complain?—It wants all that money spending upon the upper river,

Mr. Samuelson—continued.

river, and a good deal more. I believe that there is great credit due to the Conservators for what they have done, so far as their means would allow them.

156. It has not been want of will but want of means, if they have not done all that you think ought to have been done?—I think so. I think however that they devote too much attention to the navigation, and that they should think of other things as well.

157. I presume that the navigation contributes to the revenue, does it not?—It is such a very small item, merely 4,000 *l.* a year; and the expense of getting that in is pretty nearly as much money, if not more; it does not pay them to have lock-keepers at some of their locks.

158. I think you stated that in the time of flood in the autumn, you abolished your gates?—Yes; whenever we see a flood coming, and we have not yet replaced them.

159. Then you have been without water probably for a very considerable time?—No, we have not got so much water; but we do not depend much upon the water; we want it, of course, for power; but we find that the water is not to be depended upon.

160. What amount of steam power have you?—I think we have about 500-horse power.

161. What do you suppose is the average amount of your water power throughout the year?—It is supposed to be 21.

162. Then in your case a very small amount of compensation ought to buy up your water rights?—Yes, certainly.

163. With respect to those mills generally upon the Thames, what is your opinion; would it be easy to compensate them for the abolition of their water power and the substitution of steam, or would it involve a very large amount?—I should not feel myself competent to give an opinion.

164. Have you never considered that point?—No; people have such different notions of these things. I have not looked at it myself. We depend very little upon the water, because it is so very uncertain.

165. Then you would sell your rights for something small?—Yes; we would be very glad to do it for a reasonable sum, if we could only get rid of the floods.

Mr. Richardson-Gardner.

166. The table which you have handed in, with the list of the number of floods that have taken place in the Thames Valley since 1821, are on good authority, I presume?—Yes.

167. In that list you show that from 1821 down to 1877 there have been 27 important floods; from 1821 to 1877 is 56 years, and 27 floods in 56 years gives on an average a flood every two years?—Yes, it would, thereabouts.

168. Do you anticipate, from what you know of the circumstances of the Thames, that these floods will decrease or increase in number?—I think they will increase, in consequence of so much extra sub-soil drainage, which carries off the rain so quickly from the land.

169. You mean owing to artificial causes?—Yes.

170. Are you aware that in the Report of the Conservators of the River Thames submitted to Parliament in compliance with the Order of the House of Commons, it has been stated that there

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Mr. Richardson-Gardner—continued.

have been four high floods from 1821 to 1877?—Yes, I stated so at the commencement of my evidence.

171. Surely one or the other must be incorrect?—Both the gentlemen are living who have given me that return which I have handed in.

172. Will you give the names of those gentlemen?—Mr. Curtis and Mr. Holgate, both residing at Staines. Mr. Curtis is a descendant from the great botanist.

173. It is impossible that he could have made this out from his own knowledge; from 1821 to 1877?—They are both very old; I believe both of them did.

174. Do they say that they wrote it out from their own knowledge?—Mr. Curtis handed it to me. There is a flood mark at Staines, and he took it from that mark.

175. I observe that the last flood was 5 ft. 9 in. in 1877, and it was the greatest flood that you have ever known since 1821, which was seven feet?—Yes.

176. And the least flood, I think, is 4 ft. 4 in. less than the greatest flood that ever occurred?—Yes; I may also say that Mr. Holgate has taken it in his own garden, which goes down to the river.

177. Under the Thames Conservancy Act of 1866 they have powers to compel all the riparian towns to take their sewage out of the Thames, and to dispose of it in other ways?—Yes.

178. Have you had any notice of that sort sent to you, and have you acted upon it?—We have had notice. I think it was 12 months since. I was then a member of the local board, but I am not at present; but I know that the matter is before the local board, and they do not know what to do.

179. When all these towns have carried the drainage elsewhere to sewage irrigation farms, or adopted any other *modus operandi* that they may adopt, when those floods come is it not probable that the overflow of the Thames will pass through all those drains and on to the irrigation farms, or into any other arrangement that they may make, and so carry the sewage which was intended to be brought away from the Thames, back into the river again?—That was done at Eton the last flood, I remember.

180. You believe that that is probable?—There is no doubt about it.

181. At Eton is there an irrigation farm?—Yes.

182. No doubt all the sewage that was there deposited was carried back into the Thames?—Yes. After we made an arrangement to go and see this sewage at Eton, when we went down we could not get there for the water.

183. So that, after you had spent a large sum of money in complying with the terms of the Conservancy Act by carrying the sewage from the Thames on to the irrigation farm, if, on the average, you had a flood once in two years, all that manure water would get back into the Thames, and so into the water of the companies that supply the metropolis?—That would depend upon the height of the flood; I do not think that a little flood would do it.

184. Would not it be sufficient to overflow the banks, and carry it over the irrigation works?—I should not think it would do so at Eton.

185. Also artificial manure used by the agriculturists would go into the river?—Yes, it all goes

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Mr. Richardson-Gardner—continued.

goes into the Thames, and the London people drink it.

186. So that if something is not done to mitigate these floods, all the money spent by those respective towns on the borders of the river would in fact be null and void every two or three years, when those floods come down?—Quite so; and not only that, but I believe that my children, if I do not myself, will live to see all those London waterworks done away with, and people will have to get every drop of their water from wells. The whole of London will have to be supplied with it.

Mr. Richardson-Gardner—continued.

187. You have told us of the effect of inundations, and the damage to property and the houses of cottagers and other houses that are swamped by it; you have not told us anything about the injury to crops or stock; perhaps your information would hardly go to that?—It would be mere hearsay; I have not seen stock carried away, but I have seen the land destroyed and the crops ploughed up again. At Horton there is one farm of upwards of 400 acres, and during the late flood there were not 10 acres of crop to be seen for water upon it. That is between Windsor and Staines.

## The Very Rev. the Dean of CHRISTCHURCH, Examined.

Dean of  
Christchurch.

Chairman.

188. PERHAPS you will kindly tell us the result of your own own experience as regards the effects of floods in Oxford within the last few years?—I should say shortly that between October 1875 and March 1877, about 18 months, we have been nearly half that time with the low lands under water, Oxford being nearly in the condition of an island during that time. I will not pledge myself to a week or two, but that is a rough statement which is not far from the truth; sometimes in that period the floods have been higher than have been known since the year 1852. No doubt the effect on the meadow lands, of which we are the owners to a considerable extent, has been very disastrous; the fine grasses are destroyed by the floods, and a very rank, coarse herbage grows up, sedge and marsh-marigold and other coarse weeds, and it takes a long time to restore the good herbage.

189. You have experienced the ill-effects of it on land, the property of Christchurch?—Yes, anybody who at this moment will walk round Christchurch Meadow will see it with his own eyes without any possibility of doubting it, I think.

190. In a sanitary point of view have you any remark to make upon the effect of the floods in the Thames Valley?—In a sanitary point of view Oxford has the advantage of lying on a dry bed of gravel, the greater part of Oxford being quite raised above the floods. But I think the best thing that I can do would be to refer to a letter written in the year 1874 by Professor Rolleston, the Professor of Physiology at Oxford, of which I will read a part. He says: "I feel justified in taking it for granted that Oxford deserves the character which it has for being a place the reverse of invigorating; the necessity which so many of us are under of leaving it, in spite of all its literary and other conveniences, for longer periods and at shorter intervals than other busy men leave the place in which they live and labour, bear a plain testimony in a practical way to the truth of what we so constantly hear in this sense. What is incumbent upon me to attempt is, firstly, to show that the evils in question are really referrible to the particular cause specified, viz., the water-logged condition of our surroundings; and secondly, to suggest how this state of things may be remedied. Firstly, then, marshy land has from the very earliest period of observation been credited with the production of malarious disease, and so far ancient

Chairman—continued.

and modern views are together. Modern investigation, however, has gone beyond ancient in divining that the best known malarious disorders are by no means the only result of marsh impregnation; and it may be taken as something fairly certain that much of the ailing, many of the ailments, so rife in marshy districts, are but milder manifestations of what we call ague or remittent fever when somewhat exaggerated. Something like a crucial experiment upon this point has been put upon record for us by Colonel Ewart and Dr. Sutherland in their "Report on the Causes of Reduced Mortality in the French Army serving in Algeria," p. 19 (Parliamentary Blue Book, published 1867), where they inform us that reducing the waterstead 20 inches below the level it formerly occupied in a certain district (Boufarik) in Algeria, has been followed by a reduction of the annual death-rate from 57 per 1,000 to 24·8, and to an even lower rate still. But, further, recent statistical investigations carried on independently in England and in America give us good reason for believing that even more serious diseases than any which used to be accounted malarious are increased and multiplied, if not indeed engendered, by marshy surroundings. The discovery I refer to has been summed up as follows by Mr. Francis S. Powell, in a letter published in the "Times" of 29th December 1873: 'Consumption is produced by dampness of site; we seek to secure dryness of site.' Thus writes Dr. Bowditch, the distinguished chairman of the State Board of Health Massachusetts (Report of 1873):—'I think that my experience justifies me in saying that simple exposure rarely, if ever, causes consumption. But when combined with moisture of soil in and around houses, it is a prominent fact in the annals of consumption in my locality.' Thus again Dr. Buchanan (Report of Medical Officer of Privy Council, 1867): 'On looking into the list of districts (after a separate study of each), with special reference to the point suggested by last year's inquiry, the wetness or dryness of soil, it soon appears that the districts arranged in the order of the prevalence of consumption in them, are also, to a very great extent, arranged in the order of the dryness or wetness of the soils. Wetness is a cause of phthisis to a population living on it. No other circumstances can be detected, after careful consideration of the materials accumulated during the year, that coincides on any larger scale with the greater or less prevalence of phthisis, except the one condition of soil.' And, lastly,

*Chairman*—continued.

lastly, Mr. Williams, in the recent reports on Wales, remarks: 'In those towns where sanitary improvements have been effected, the drying of the soil has led to a diminution of consumption.' What is said of consumption may be said probably of rheumatism, and some allied disorders." But I believe that Oxford is not generally an unhealthy place; epidemics are very little known there; and I should say that the utmost that can be said is that when persons get ill they are obliged to go away to recover.

191. Have any means been taken by the authorities of Oxford, either the University or the town authorities, to check or abate the floods in the neighbourhood of Oxford?—No, nothing has been done by us; the difficulty of doing it has been very great. There have been frequent and constant attempts, and committees have been formed, on various occasions. I may mention a person, whose name will command respect here no doubt, that of Mr. Philip Pusey, well known as an agriculturist; he formed a committee for the purpose of endeavouring to abate the floods, and relieve the lands of superfluous water, as long ago as the year 1853. That was the year after the great flood of November 1852, at the time of the Duke of Wellington's funeral, a well-known flood. He formed a committee at that time for the purpose of abating the floods. Various meetings were held, but, not very long after, he fell ill and died, and the thing fell through. In fact, the difficulties were very great. We could not act without the concurrence of the then existing Thames Commissioners, who were a very large and unwieldy body, and it was found impossible to do anything effective. Various other attempts have been made since. A number of influential persons joined together to present a memorial to the Government in 1862, asking them to take up the question as one of general concern. I will cite part of the memorial: "Whereas the unregulated action of floods inflicts damage on many lands adjoining the river, and is injurious to the health of the district; whereas it is certain that these evils would be greatly abated, and the public health improved by a more complete and systematised management of outfalls, dams, and sewers than is at present possible; whereas, also, a report on the Thames basin, with reference to these several particulars, would establish principles applicable to other river systems, and would yield much information bearing upon the public health and of service to the nation at large, and may properly be therefore esteemed a national object: the undersigned solicit the Government to cause full inquiry to be made, in such a way as they may see fit, into the condition of the Thames and its tributaries (the immediate district of the metropolis being excepted from such inquiry, as are already under special jurisdiction); to inquire what defects exist; and to report what remedies can be applied to such defects; having regard generally to all purposes by which the river and its branches, or lands adjoining thereto, may be improved," &c. This memorial was signed, among others, by E. Sabine, then President of the Royal Society; Roderick Murchison; Richard Owen; C. B. Adderley; G. Graham, then Registrar General; W. Farr; Thos. Watson, then President of the College of Physicians; Neill Arnott; Robt. Rawlinson, of the Local Government Office; and, at Oxford, by H. W. Acland, 0.114.

*Chairman*—continued.

Regius Professor of Medicine; John Phillips, Professor of Geology; B. C. Brodie, Professor of Chemistry; J. C. Clutterbuck, Long Wittenham; and others.

192. What reply did you receive from the Government to this memorial?—We received, I think, only a general promise that the subject should be considered. But the whole question of drainage, including that of sewerage, was taken up by the House of Commons in 1864, and a Select Committee appointed. Then came the Thames Navigation Act of 1866, which placed the whole river under the Conservators. What we recommended was very much the same as was afterwards recommended by the Rivers Commission in 1869.

193. Will you kindly state those recommendations?—Shortly it was what I have stated, that there should be a general scheme formed for the whole valley, to get a sufficient outlet, beginning at the bottom, and then to proceed upwards, providing outfalls and outlets at the different locks and mills as you went up the river, but that it should all be done according to a general scheme and plan.

194. What authority would you suggest to undertake those things?—I should like to suggest that an engineer, appointed under the authority of the Government, should prepare a general scheme for the whole Valley from Teddington Lock upwards.

195. Supposing that the Thames Conservancy, which is the authority at present having jurisdiction over the Thames, were reconstructed, so that the owners of property and the local authorities in the upper part of the river should be fully represented, do you think that such a board would be competent to grapple with the difficulty?—I must be allowed first to make a little correction in your statement, that it is the only power having authority.

196. I am aware of the Drainage Commissioners?—Yes, their jurisdiction extends from Cricklade to Long Wittenham (or Clifton Hampden). Between these points the Thames Valley Commissioners have power to execute works, and, if the Thames Conservators oppose, to apply to the Board of Trade to sanction those works. They have an independent authority, in fact, in the upper valley.

197. Have the Drainage Commissioners undertaken any works at present?—They have put matters in train; they have divided the whole valley into seven districts from Cricklade down to Long Wittenham; those districts have each elected representatives, and those representatives have elected a central commission, who now have power over that part of the valley. It may be about one-half the length of the upper valley from Teddington Lock. The Commissioners have authority from Cricklade to Long Wittenham, just above Dorchester, a distance of about 50 miles, or rather more as the river runs.

198. Do I rightly understand that they have carried out any works?—They have commissioned the representatives of districts No. 2 and No. 4, to execute works at their own expense, and I believe that those works have been commenced. The district No. 2 is called the Lechlade district, from the principal place in it; and No. 4 is called the Northmoor and Cumnor district. The representatives of those two districts, I believe, have actually begun, as they are empowered to begin, under

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under the Act of 1871, the Act constituting the Thames Valley Drainage Commissioners. The Commissioners also agreed to ask Sir John Hawkshaw to present a general plan for the drainage of that part of the valley; but when this Committee was appointed it was thought best to suspend further operations until it was known what this Committee would recommend.

199. Are you one of the Drainage Commissioners?—I am one of the representatives of the Oxford District, No. 5.

200. Have you an opportunity of knowing whether Sir John Hawkshaw could give evidence upon the best means of remedying those evils?—No, I think he could not give precise evidence at present; he said that he must be empowered to have sections made before he could furnish a scheme; he could give general recommendations, no doubt; but any estimate or anything like a precise plan he said he could not give, until he had been allowed to make sections; and it was in contemplation to give him that power when this Committee was appointed.

201. Have you confidence in Sir John Hawkshaw, from his knowledge of the river, that he is fully competent to do what will be required?—No, I do not know he has any special acquaintance with the river; but he has great experience of other places, for instance, at Cambridge and in Holland. There are very large works in Holland, which he has executed.

202. Have you any suggestions of your own to make to the Committee as regards the means to be adopted for the abatement of the floods?—We have consulted a number of engineers at various times, and they all agree that what is wanted is, in the first place, wider side outlets or tumbling bays above the several locks and mills, and in general a larger waterway for the escape of the floods, both in the main channel and in the side streams. About Oxford there are a number of such side streams, which would assist the main channel materially if they were cleared out and made available. All the engineers have given some general advice, but I cannot presume to go into particulars upon the subject. I must leave that to the engineers. You are probably aware that Mr. Leach and Mr. Beardmore, the engineers of the Thames Conservators, in January 1869, drew up a plan for relieving the river about Oxford, but only just about Oxford; they gave estimates for about three miles above Oxford, and about three miles below; they gave plans and estimates for relieving that portion of the river. Taking a general view of what they recommended, it is just what I have stated, to provide sufficient overflows and channels of large capacity, to straighten the course of the river where it was needed, and, generally, to facilitate the down-flow of the stream.

203. I think you stated three miles above and three miles below; what was the amount of that estimate?—The amount of the estimate at that time was 29,758*l.* With regard to that, one of the gentlemen remarked, in the interview with Mr. Cross the other day, that the effect of such works would be that they would relieve us, but would send down the water with increased force on the lands below us; and therefore Sir Charles Russell, I think it was, stated that our operation should begin at the bottom and proceed upwards. But every one takes care of himself, and if we

*Chairman—continued.*

send down the water to people below us, they must take care of themselves, I suppose. But I think such mischiefs might be avoided by a general scheme; and what I should wish to suggest would be that the Government should be asked to appoint an engineer under their authority to prepare a plan for the whole area, and then to leave the persons interested to carry out the works, giving them the power to levy rates on lands which might be more or less benefited by the same. That is what the Drainage Commissioners for a portion of the river can do now. They have power to levy rates on all land above a certain height, I believe 5 ft. above a fixed flood level. I do not know the exact level that was taken. Then a difficulty comes in with regard to the power of the Conservators. They have power no doubt to check our operations very much, and they have funds in their hands which, as we contend, belong exclusively to the upper river. They derive 6,000 *l.* a year from the water companies. The water companies were required to pay that sum because the towns were to be required to purify the Thames, and furnish clean water to the water companies. The towns have been engaged on that work ever since. Oxford has borrowed, or is in the course of borrowing, some 140,000 *l.* for its drainage, and the Oxford sewage will very shortly be taken out altogether. Therefore the 6,000 *l.* a year which the water companies pay ought by rights to go entirely to the use of the upper river, who are immediately concerned. The tolls which the Conservators take are, of course, levied for navigation purposes; but the 6,000 *l.* a year from the water companies we contend ought not to go to navigation purposes. This sum was given on account of purification purposes, and it ought to be reserved for that part of the river in which the purification works are executed.

204. You are quite of opinion that the amount contributed by the water companies should be credited to the upper part of the river?—Yes, I am of that opinion. I do not see what the people below have to do with it; they have not spent any money to purify the water for the water companies. The people who have spent their money to purify the water for the water companies are the towns above the tidal way.

205. To carry out the works that you have alluded to, supposing that the Government had required some eminent engineer to report, would it in your opinion be better carried out by the Drainage Commissioners or by the Thames Conservancy, or that those two public bodies should be merged in one?—I am afraid they are so hostile at present, that to get them to act together would be difficult. The representatives of the upper river in the Thames Conservancy are so extremely few, and the attention of their brother Conservators is necessarily so much given to the lower river, that we cannot hope to see the interests of the upper part of the valley duly consulted. At least this is a very general belief.

206. Assuming that the Thames Conservancy should be so reconstituted that the owners of property in the upper river should be fully represented, say half-and-half, would that body, in your opinion, be competent to carry out those works to the satisfaction of the upper part of the river?—I should be extremely sorry to say they would not be competent, but whether they would, or indeed could, devote their time, energies, and thought

*Chairman—continued.*

thought to it, as people would who are directly interested in it and resident on the spot, I think is very doubtful.

207. Has there been any suggestion made for the formation of an impounding reservoir near Oxford?—No; we have not taken that into consideration at all. I do not think the Thames Drainage Commissioners would be at all prepared to enter into that subject.

208. Supposing that plans satisfactory to the Drainage Commissioners, and approved by the Government, were agreed upon, would the owners of property in the neighbourhood of Oxford be willing to be assessed for the carrying out of this work?—Some of them certainly would be; I believe that the Duke of Marlborough would, and Mr. Harcourt of Nuneham.

209. They are the largest landed proprietors, are they not?—They are very large proprietors there; and then the colleges, I believe, who have considerable property, would be willing.

210. Do you attribute the increase of the floods at all to the tributary, the Cherwell, which flows, I believe, into the Thames near Oxford?—Yes, a very great deal of water comes down the Cherwell. Sometimes the floods come principally from that side, sometimes principally from the Gloucester side. It depends upon where the rain-fall is. There is another thing to be noticed, that the Drainage Commissioners have power over the tributaries as well as the main body of the river, whereas the Conservators only have power over the main stream.

211. Then the Cherwell would be included in the power of the Drainage Commissioners?—Yes, the Cherwell, the Ray, Ock, Windrush, and Evenlode, and those rivers contribute considerably to the floods. But it must be noted that quite one-half of the non-tidal river below Long Wittenham or Clifton is not provided with any administration except the Conservators; so that, if it was contemplated putting it into the hands of the Commissioners, something would have to be done with regard to that portion of the river, I mean the part between Long Wittenham and Teddington.

212. The jurisdiction of the Thames Conservators extends, does it not, from Yantlet Creek, near the Medway, up to Cricklade?—Yes, that is so. Then I say below Long Wittenham, down to Teddington Lock, nobody has any jurisdiction except the Conservators; and, therefore, if that is to be treated in a similar way with the part of the valley above Long Wittenham, some measures must be taken with regard to that part of the river.

213. I gather from your remarks that you would rather that Commissioners similar to those for the upper part of the river should have the jurisdiction of the lower part of the river in the place of the Thames Conservancy?—I cannot but think that that would be the best course. If it was to begin afresh, perhaps I might have a different opinion; but things have gone so far now, that the upper valley can hardly be taken out of the hands of the Drainage Commissioners. We have obtained plans of the whole valley with the levels furnished by the Royal Engineers, which has cost us a considerable sum of money, and we are on the eve of beginning work, if it has not been already begun.

214. Allow me to ask you your reason for 0.114.

*Chairman—continued.*

believing that the jurisdiction of the river would be better in the hands of a commission, than in the hands of a modified Thames Conservancy?—I think in the case of any Thames Conservancy, as far as I can see, their main interests will be in the London parts of the river. I cannot conceive any modification of the Thames Conservancy being such as to give them the same direct interest in improving the upper parts of the river as resident persons would have. If the Thames Conservancy was divided into two bodies, the one having the upper part and the other the lower part, that I daresay might satisfy all that one requires. But as to a single Conservancy, I could suggest the name of a gentleman who, if you called him before you, would tell you some reasons for thinking that such a Conservancy, whose main business is in London, burdened with all the care of the river about London, cannot give time and attention to the upper river such as is wanted. I thought otherwise at one time, but I confess I have been converted to that opinion.

215. Then I think I understand that if a Conservancy were appointed to the lower part of the river from Teddington downwards, and another Conservancy from Teddington upwards, those two bodies would work better, in your opinion, than one body taking jurisdiction over the whole length of the river?—I cannot but believe that.

216. I think you were going to suggest the name of some gentleman who could give that information?—Mr. Harcourt, of Nuneham.

217. If the jurisdiction of the river were divided into two parts, as you suggest, the upper part taking the sum of 6,000 £., which I may tell you will increase eventually to 8,000 £., what funds would there be left for the management of the lower part of the river?—For that I must refer you to the Thames Conservancy; I am unable to inform you. They declined, in the early part of this year, to furnish the Drainage Commissioners with any account specifying what they have spent upon the upper part and what they have spent on the lower; they furnish their accounts to Parliament in manner prescribed by the Act under which they are constituted, but they declined to furnish us with an account of their receipts and expenditure distinguishing between the two portions of the river, therefore I am unable to answer that question. But even if I knew the particulars, I do not think that I should alter my opinion that we ought to have that money.

218. Have you seen the report of the Thames Conservancy of the 19th of February of this year?—Yes, I have it here.

219. Do you observe on page 9 a statement of the Thames Conservancy as regards the upper navigation?—That is a gross account for 10 years.

220. Does not that separate the receipts and expenditure?—It does for the 10 years, but we wished for more specific information, separating the years, and separating the later years especially, and that we have not got.

221. I think I understood you that there is not the very best understanding between the Thames Conservancy and the Drainage Commissioners?—I am sorry to say, very much the contrary.

222. Supposing the Drainage Commissioners were

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were merged in your proposed Upper Thames Conservancy, do you think that the two Conservancies would work in a more friendly fashion?—I know of nothing to prevent it.

223. And you are not afraid but that the money needful for the works would be supplied by the upper part over and above the tolls and contributions of the water companies?—It is a very rash thing to pledge one's self to say what people would object to, and what they would not. I know a great number of persons who would be very glad to be relieved of the floods, and would be willing to pay their quota; but how far there might be an objection on the part of many persons I am quite unable to say.

224. In your opinion, would the contributions required be more than compensated by the advantage from the abatement from the floods?—I think so. But I may here say, that we think, with regard to the preliminary expenses, such as the preparation of the plan and levels of the valley, together with any Acts of Parliament that might be needed; in these points we might hope we might get some assistance from the Government.

225. In what way?—In paying the expenses of employing an engineer to furnish a general scheme, paying the expenses of Acts of Parliament, and the payment of the Royal Engineers for furnishing levels for the purpose of determining the rateable area. All those preparatory measures, which no doubt the Government could do better than we could do, we think that we might be assisted in. We might also hope that Government would enable us to borrow money for executing works on the security of the rates, and on easy terms.

226. And you think that the owners of property might fairly call upon the Government to help them?—The owners of property and towns.

227. Might the owners of property and the towns fairly call upon the Government to bear that expenditure?—I hope we might; and I venture to support my expectation by reference to the memorial presented in 1862, in which many persons, whose opinions must carry weight, speak of the national importance of the Thames Valley drainage (see Question 191).

*Mr. Walter.*

228. Am I right in supposing that the locks in the upper valley of the Thames are the property of the Thames Conservancy?—Yes.

229. I presume that the floods about Oxford are mainly influenced by the state of the locks at Iffley and Sandford to a great extent?—Influenced chiefly by the insufficiency of the side outlets above the locks and mills.

230. Have the Drainage Commissioners any control over the locks?—None whatever.

231. Then I presume that is the point that you complain of, that the regulation of the locks being of vital importance to the discharge of the flood-waters, your Board has no control over that discharge?—Perhaps I ought to correct the statement, when I say "none whatever." Under the Act they have the power of executing works with the sanction of the Board of Trade which would provide outlets above the locks by weirs and side flows.

232. Have they put those powers in operation?—No; because, before we begin any work, we

*Mr. Walter*—continued.

think we ought to have a general scheme, and we have not procured that.

233. Has your attention ever been called to any scheme, or has any scheme been proposed for cutting channels across the loop in the river between Abingdon and a point which comes down on the map, a sort of elbow at Ridge Weir?—There are a number of places where the engineers suggest that we should straighten our river, partly by cutting off the elbows, and partly by cutting new channels. There is one place, two miles and a half below Oxford, where it is suggested; but these are all engineering details on which I should rather wish not to enter.

*Mr. Cartwright.*

234. I think you said that there was an outfall designed somewhere within the range of three or four miles below Oxford?—I said that that was the distance of the river below Oxford which Messrs. Beardmore and Leech, the engineers of the Thames Conservancy, proposed to amend, and to provide at various points large side outlets above the mills and locks, and also to dredge the main channel and clear the side-streams, and to provide generally for the more easy and rapid escape of the waters.

235. Then I think you spoke of the deficiency of the outfall above Oxford?—Yes.

236. Could you at all indicate the points where those outfalls are in the part above Oxford where they should be amended and improved?—These are some of the points: King's Weir, Godstow Lock, Botley Bridge, and Osney Lock. Those are all above Oxford; they are obstructions at present, and an insufficient escape of water.

237. Do you think that it would be easy to make a better outfall?—No difficulty at all, if the money were forthcoming.

238. You attribute a good deal to the Cherwell?—A great deal of water comes down the Cherwell.

239. What is the particular improvement which you would suggest with reference to the Cherwell?—There is a side channel opening from the Cherwell about half-a-mile from its mouth which has been completely blocked up; if that was cleared out, it would go a great deal towards carrying the water of the Cherwell down more quickly; that would be one thing. Then there is the mill above Magdalene Meadow; in fact, all through there are a number of small details which none but an engineer could really give an opinion upon.

240. Is there any engineer who is more practically conversant with, and has inspected the rivers, who could suggest what is desirable?—No one has inspected them minutely that I know of, except the engineers of the Thames Conservancy; but there has been no inspection of the side streams, only of the main stream, I believe.

*Mr. Samuelson.*

241. You stated, I think, that the Thames Drainage Commission was constituted in 1871?—Yes, the Act was passed that year.

242. What is the length of the stream over which their jurisdiction extends?—From Cricklade to Long Wittenham or Clifton Lock; I think it is about 50 and 60 miles as the river flows.

243. What are the special duties of the Commissioners?—The first duty of the Commissioners



Mr. Samuelson—continued.

was to divide the whole valley under their control into districts; and then they have power, with the consent of the Conservators, or, if the Conservators object, with the consent of the Board of Trade, to execute works for facilitating the escape of the flood-waters.

244. The Conservators still holding the control over the locks?—Entirely of the navigation, except, as I said before, that in every lock there is an overflow bay to provide, when the water rises above a certain height, that the water may escape to the level below the lock; and the Drainage Commissioners have power to increase those overflows without the consent of the Conservators, but with the consent of the Board of Trade; the Board of Trade have a power overriding the Conservators if the Commissioners can show sufficient cause.

245. Assuming that the Conservancy Board are re-constituted so as to represent all the interests involved, would it not then be possible to entrust the detailed management of the different districts to committees of the Conservancy?—If the committee of each district had a certain sum allotted to them to deal with, and if they were allowed to spend money up to the requirements of the district, it probably would be possible. What you want is to get people really interested in the place to have to do with the improvements, and to furnish them with money to carry out their plans.

246. If there were proportionate representation on the Conservancy Board, would not that give sufficient power to those who are interested to carry out through the Conservancy the recommendations of the committees which I am supposing to exist?—I fear not. I suppose the representatives of the lower part below the tidal water would always be more numerous than the representatives of the upper part.

247. Need that be so, if it could be shown to be undesirable?—I am merely suggesting that it is almost certain to be so. I should think that the interests of that part of the river are much larger and more complex; and if so, the representatives of that part must outnumber those of the upper river. In the upper part the operations which are necessary are extremely simple, and so long as the navigation is not interfered with I should have thought that people who were directly interested in it, as residents, would be the best persons to carry out the works most cheaply and most satisfactorily.

248. You find that there is now a certain amount of divergence between the Drainage Board and the Conservancy; do not you think that that same state of things would be likely to arise between two distinct Conservancy Boards?—Perhaps so. But the divergence which I apprehend arises from the fact that over a certain part of the river there is a concurrent jurisdiction of conservators and commissioners.

249. If there were representation on the Conservancy in the ratio of taxation, do not you think that that might be an arrangement that would work?—But how would taxation be settled beforehand? The taxation would depend upon the quantity of works to be done, and until it is determined what works are to be done, you would not know what the taxation would be, and no proportion could be settled.

250. There would be a preliminary estimate, I suppose, in any case?—Yes, but then it does  
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Mr. Samuelson—continued.

not follow that you would undertake all the works at once. To meet the difficulty it might be possible to hand over the navigation of the upper river to the Commissioners. But this is only a crude suggestion.

251. Are there not certain duties which are common as between the upper and the lower portions of the river?—I am not aware.

252. The quantity of water allowed to flow down for the purposes of scouring the river, I suppose, would be a very important question, would it not, as affecting the lower part of the river?—Those are questions on which I would rather not enter; I would rather decline to go into engineering questions.

253. Still that is a question which would affect the extent of the jurisdiction as between the upper and lower part of the river?—But I began by saying that my suggestion was a crude one, which might be quite impossible to carry into effect. I merely throw it out as a thing which I have heard mentioned.

254. Within the area of the jurisdiction of any body that might exercise such jurisdiction, would you include the tributary valleys?—Certainly; I think any attempt to remedy floods would be quite nugatory unless it carries power to deal with the tributary valleys. As I have said, in that portion of the river which is now under the Drainage Commissioners, they have power over the tributaries.

Mr. William Cartwright.

255. Would you give them power over the Cherwell?—They have power over the Cherwell already.

Mr. Samuelson.

256. How far do their powers extend up the Cherwell?—Up to Heyford. But the waters that collect in Otmoor come down into the Cherwell very rapidly.

257. The Cherwell extends considerably above Banbury, does it not?—Yes.

258. Are you aware that there are very heavy floods up the river?—Yes, I am aware of that. The Commissioners have power up the Cherwell to Heyford, up the Ray to Merton and Ambrosden, up the Evenlode, the Windrush, and the Ock to certain points. The Commissioners can execute works to abate the floods in these tributary valleys; but in these valleys the Conservancy have no power.

259. The Thames Conservancy do not interfere with them?—No.

260. We do not find that you have been doing anything very much?—The Commissioners have not had time; they are but just constituted; the elections only took place last autumn; we have given powers to two districts to clear out the stream within their own limits; we began to consult an engineer on a general scheme; then we stopped our hands in consequence of this Committee.

261. Is there any reason to hope that measures may be taken by the Drainage Commissioners to prevent disastrous floods in the Cherwell Valley?—I hope so.

Mr. Walter.

262. Can you tell me whether, so far as the prevention of floods is concerned, there is anything in the duties of the Thames Conservancy,  
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Mr. Walter—continued.

or in their objects, which conflicts with the duties and objects of the Drainage Commissioners?—I should not think so.

263. That is a material point, is it not?—If the prevention of floods can be managed by a better regulation of the existing locks than is at present observed, of course a great deal of money would be saved by doing that rather than by executing new works. I mean, if the Thames Conservators and the Drainage Commissioners were in accord with regard to the prevention of floods, is there any reason why the necessary works should not be carried out under the superintendence of the Thames Conservancy?—No, I know of none, if they would give their attention to it.

264. The Thames Conservancy have no interest, I presume, in maintaining the floods?—None whatever. What is complained of is, that they do not give their attention to the upper part of the river. I do not say that it is so, but that is the complaint.

265. You have no power to compel them?—No.

266. All you can do is to make new works, at considerable cost to yourselves?—Yes, but these works are necessary to abate the floods, and more required for the lands and towns than for the navigation.

267. Do you suppose the existing locks to be sufficient, if they are properly looked after?—They are not sufficient for drainage purposes; what we want is increased tumbling bays, and increased dredging of the river, and clearing out certain channels.

268. We have had evidence to show that a great deal of mischief is done by the locks not being properly regulated and opened at proper times; do you agree with that?—There may be something to be done there; but I not think there is much complaint on this point in our part of the river.

Mr. Samuelson.

269. What are the taxing powers under your Act?—We have power to tax all kinds of persons whose lands lie within the contour level of five feet above the level of a fixed flood line.

270. Is there any power of taxing houses?—No, none.

271. So that all the villages or towns lying on those streams would contribute nothing?—No; we have no power to tax them.

272. Of course, that very much limits the revenue which you are able to raise?—Yes.

273. And consequently the extent of the operations which you are able to carry out?—Yes.

274. Do you consider it desirable that powers of taxation on houses should be conferred upon whatever body may be charged with the management of the Thames and tributary streams?—Judging from the representations that I heard made by the representatives of the towns of Reading, Windsor, Staines, and others, to the Home Secretary the other day, I should suppose that they ought to be. They complained very much of the damage done to them by the floods, and, if money is spent in relieving them, it would seem but fair that they should contribute. I am bound to say that no representations of this kind were made on behalf of Oxford.

275. Have you any knowledge of the opinion

Mr. Samuelson—continued.

of the city authorities of Oxford upon that subject?—I have not.

276. Would it be possible to carry out the necessary works without greatly overtaxing the land, unless the power of taxation on houses be granted?—I cannot answer that question, because I do not know what the expense of the works would be, or what the rate on the land would be. But it certainly seems fair, if those towns complain that they are greatly injured by floods, and if they are relieved from the damage done, that they should bear part of the expense.

277. Do you know whether that question has been fully considered by the city of Oxford?—No, I do not think it has been before them; I do not know that they have taken it into consideration.

278. Then to notice any casual opinions that may have been expressed would be rather prejudging what their deliberate opinion would be?—Certainly.

Mr. Richardson-Gardner.

279. One very important element in this inquiry is as to the frequency of floods, and as to their probable increase during future years; we have a statement put in by a witness, showing that from the year 1821 to 1877 there have been no less than 27 floods, averaging in 56 years a flood every two years; on the other hand the report of the Thames Conservators to Parliament says that there have only been four floods during that time?—Four great floods.

280. Those are also great floods that have been given here, averaging four feet; have you any knowledge yourself as to the frequency of floods, or what may be called floods to some extent?—I have no statistics, but I am quite certain that we have had floods much more frequently than four times. Those four have been extraordinarily high floods. Of course I know nothing about the 1821 flood, as it was before my time; but I remember the 1852 flood, the year when they were going up to the Duke of Wellington's funeral they were not able to use the Great Western Railway because it was stopped by the flood; the same thing took place at the end of 1875.

281. In the intermediate dates can you remember any floods that were at all serious?—No, I cannot supply any particulars; but they have been frequent.

282. You cannot tell us, I suppose, whether you think that they will increase from circumstances beyond natural causes, such as sub-soil drainage, and that sort of thing, in the future?—No, I have no means of judging.

283. You have told us that you were about to spend 140,000 £. upon the drainage of Oxford under an Act of Parliament obtained by the Thames Conservators for the purpose of making the riparian towns drain away from the Thames; can you tell me what form of drainage you have adopted at Oxford; is it sewage irrigation, or what is it?—We have adopted the plan of carrying all the sewage off separately, as far as possible, from the rain-water that falls in the streets, and carrying it down to a place about 2½ miles below Oxford; there it has to be raised by pumping on to the sewage irrigation farm.

284. The object of the towns in the upper part of the Thames being obliged to drain is to purify the water so that the revenue might be got

Mr. Richardson-Gardner—continued.

got for the water companies from the upper part of the Thames?—Yes.

285. When these floods come, is it not probable that they will enter the drains, and is it not desirable to secure that there is nothing in the irrigation farm to carry the manure back again into the Thames, from which you want to exclude it?—No, I do not think that in our case it would be so. The sewers are constructed with such care as to be practically water-tight, and the land on to which it will be pumped is so much above the river and so far from it that I do not anticipate any danger therefrom.

286. And at the same time it would be perfectly effectual as regards the purification of the Thames?—I hope so.

Chairman.

287. With regard to the sewage irrigation farm, is that ever flooded?—No, it is nearly 50 feet above the highest flood.

Mr. GEORGE DINES, called in; and Examined.

Chairman.

291. You are a Builder, living at Walton-on-Thames, I think?—Yes; but I have retired from business.

292. Do you produce the rainfall in the London district from 1813 till the end of last April?—Yes (*delivering in the same*).

293. Can you certify to the correctness of this Table?—This is the average, perhaps, of ten or a

Mr. Walter.

288. Is it at Littlemore?—Yes, south east of the asylum.

Mr. Samuelson.

289. Is it your opinion that the health of the city of Oxford is very much affected by the prevalence of floods in the valleys of the Cherwell and the Thames?—I put in a letter from Dr. Rolleston on that subject which, I should prefer referring to. The upshot of it is, that in his opinion the health of Oxford is reduced to a low state during and after the floods, by the waterlogged condition of the valley, which constantly prevails during the winter months, and that this low state of health cannot be got rid of except by a change to a drier and more bracing air; it is not acute disease; but his opinion is that there is considerable injury done to the health of Oxford.

290. The system, I presume, is not so well able to resist disease?—Yes, that is what he means, I think.

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Chairman—continued.

dozen different registers, as many as I could get. I began first with only one, but afterwards I got as many as I could.

294. To the best of your belief this is correct?—It is. I think you may take it that that is very nearly the rainfall, say as far as Oxford. I have taken great pleasure in the subject for years.

Mr. Dines.

Mr. CHARLES CHARLWOOD, called in; and Examined.

Chairman.

295. You are a Miller, near Reading, are you not?—Yes.

296. On what stream?—On the Kennet.

297. Are you often inconvenienced by floods?—Very often.

298. Does your mill keep back the water?—No, only to a limited extent; we have a certain mark to work to, which we must not exceed; we must not bay the water above our water-mark at the mill-head.

299. Who has placed that mark?—I do not know; the mark is supposed to be our iron rails, that protect the water wheel from any floating timber that comes down. There is no regular mark; but if I allow the water to exceed that it would flood my house, so that we are very particular to draw the sluices to let the extra water pass.

300. Then, I presume, it is a mark for your own convenience; not placed there by any authority?—No.

301. But you do still suffer much at times from the flooding of the Kennet?—Yes, very much. I shall lose 100*l.* by my crops being destroyed this last flood, last winter, on the arable land adjoining my mill.

302. Is the health of your family affected at all by the floods?—No, I think not.

Mr. Walter.

303. You have paid considerable attention, have you not, to the subject of floods?—Yes, I have.

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Mr. Walter—continued.

304. To what do you attribute the excessive height of the floods in the valley of the Kennet?—To the natural obstructions in the river.

305. Have they increased perceptibly in your time?—In places where we dredged it out at one time the floods and the streams will down old sediment and block it up again.

306. I will ask you to define what you mean by natural obstructions of the river?—Heaps of gravel and mud washed down from the upper parts of the valley.

307. The valley of the Kennet is a bed of gravel, is it not?—Yes, it is.

308. Are you aware whether or not the bed of the river has been silted up within the last few years?—It was worse when I went there 20 years ago than it is now, because I have taken out a great deal since I have been there; I have dredged out some thousands of cubic yards of gravel out of that river in a distance of a mile-and-a-half from where I live towards Reading. When the Royal Engineers were surveying here, they told me Padworth Bridge was 70 feet above Reading, yet before I dredged, every rain caused a flood. I believe Newbury is 110 feet higher than Reading.

309. Have you dredged at a uniform depth, or taken it out in holes?—I took it out in holes where we found the worst places, where we found the obstructions. I took it out in the year 1866, at a place which used to be the Old Ford at Padworth before the bridge was there. I took out 1,330 cubic yards at that one place. It formed a natural

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Mr. Walter—continued.

a natural obstruction to the course of the water, and the water gradually wore the channel away on one side, but it was a very small space indeed for the whole of the water to pass; and, of course, when a body of water came down there it was obliged to overflow the banks.

310. Do you know whether a similar system of dredging has been pursued by your neighbours, above or below you?—Yes; there has been gravel dredged out through their seeing what the result was in my case at Padworth, in the parish of Aldermaston especially.

311. Has that had, in your opinion, any perceptible influence in the way of diminishing the floods?—We have a very great block of gravel a mile and a half below where I live, between Beenham and Ufton; in the year 1866, when I was engaged in ballasting at Padworth, I induced Mr. Benyon to allow me to spend 50*l.* to pierce a channel through this immense bed of gravel lying at this particular place. I may say that there are 50,000 cubic yards of gravel which ought to be taken out of the Kennet within the space of half a mile in that part of the river.

312. What additional depth would that give to the bed of the river?—Of course it would make all the difference of 50,000 cubic yards in a certain distance. I can scarcely say as regards a uniform depth, because it varies so, but still, by dredging, it might be brought to a uniform depth.

313. It would not have any material influence in diminishing the height of the flood, would it, except so far as removing any obstruction to the flow?—I presume so. It would add to the rapidity of the current and take more water in the channel.

314. Have you experienced any inconvenience from the weeds in the Kennet?—Very much.

315. Is any system pursued of removing them?—Not an uniform one, not a regular system. It is left to the occupiers to cut them or not as they please.

316. Have they increased much of late years?—Yes, they have.

317. Is that owing to the American weed, or what cause?—I scarcely know what weed they term it, but in the Kennet we have a weed that blows a white flower, and the river bed is completely matted with it. In the year 1860 we had a very wet summer, and my neighbour wished me to head a gang of young men, and I did. I borrowed scythes from Aldermaston, with ropes attached. The scythes were riveted together, and ropes attached to them to saw the weeds out. The result of that and of my cutting off the branches of trees that dipped into the water, was that it lowered the water at my mill tail 18 inches, and that would be, perhaps, a distance, taking the winding of the river, of three miles, by merely cutting the weeds and the boughs of the trees that grew into the water.

318. Are there no lochs in that part of the Kennet?—No, because that is the old river; but, of course, that old river runs close by some lochs at Ufton, where the Kennet and Avon Canal works out of the old river at Ufton Bridge. In the Kennet and Avon Canal there are cuts of dead water, and a part is the River Kennet itself; so that so far as we are concerned, we have no obstruction from a loch until we come to Tyle Mills. There we have Tyle Mills, and parallel with that, we have one loch in

Mr. Walter—continued.

the canal from another dead cut that comes out of the old river below Ufton Bridge.

319. How far is the Ufton Bridge above you?—Ufton Bridge would be two-and-a-half miles.

320. Has any other plan suggested itself to you for diminishing the floods, except that of dredging the river?—I advocate strengthening the banks where they are weak, and embanking in very low places, throughout the whole course of the river to Teddington. From thence to London embank the whole distance. The islands and obstructions would help to make the embankment. Respecting the dams that have been made at the mills, which, of course, are artificial ones, when we get a body of water down we draw up extra sluices and let the water by, but when it comes to those natural obstructions it cannot get by them; that is my reason for grounding my opinion upon that. I think, as regards the Thames, the principal obstructions are the islands in the river, if they were taken out, it would prevent a great cause of flooding. I know the Isis remarkably well; I know the river from Lechlade to the Nore almost as well, and in the Isis below Farringdon, taking it from Lechlade to opposite Buckland, there are an immense number of what we term scours of gravel, that is, accumulations of gravel washed up from time to time in certain places, and they almost choke up the passage of the river in dry summers below Farringdon; I could jump from the bank on to the scour of gravel.

321. Are you acquainted with that part of the river represented on the map between Abingdon and the point where you will read the words "Clifton Loch"?—Yes. If the river was cut off there, it would divert the water from Nuneham Park; that piece of land takes in Nuneham Park, belonging to Mr. Harcourt.

322. I mean above that, from north-west of Abingdon to the elbow on the map?—That we term Ridge's Weir; that would be about double the distance; it would be certainly five miles.

323. Supposing it were practicable to form a large culvert, or cut, or canal across there, would not that have the effect of immensely relieving Oxford from floods?—It would cut Oxford right off.

324. I mean, to be regulated and used as an auxiliary?—Yes, a canal or cut decidedly would relieve all that track of land.

325. Have you ever considered the question how far it is practicable or not as regards expense, and how far it would be advantageous, to make such short cuts, in order to carry off the surplus water from the upper to the lower part of the river?—I have never gone into any calculations of that sort; but the result of my experience is, that a great deal of the river cleansing can be made self-supporting, by the sale of gravel. I used all this gravel that I took out; in fact, I took three-parts of the expense on myself, although I am only a tenant, if they would allow me to have the gravel. I made up my farm roads and approaches to my place with gravel. My respected landlord, C. Darby Griffith, Esq., could give an opinion on my road making, and the incidence of the flood also. It would have cost me double that amount to have got it from the ordinary source from the pit that I am supposed to use; therefore it was a great saving to me to dredge the river, leaving the land better drained. The same applies to the mud. I have taken out a great

Mr. Walter—continued.

great deal of mud in my time, and mixed it with lime; it makes a capital compost for the meadows, and I am going to do it again soon. My mill-head becomes obstructed after the floods, which bring down a great deal of mud, and I clean it out periodically, and in the way I say, I mix it with lime. I consider that that mud is worth the cost of getting it out of the river. I may say that I do this at my own expense. It answers two purposes, to keep the power to the mill, and to produce manure for the land; and, as I say, it pays me double. With regard to the neighbourhood—Bampton, near the Isis—they have not a very good supply of gravel there to form the roads, and the consequence is that the farm roads are in a very bad condition, whereas they could dredge this gravel out and have good roads where they have now bad ones. So that it would soon pay for itself, if you could only induce people to be enterprising enough to do it.

Mr. Samuelson.

326. Where do they get the material now in that neighbourhood for repairing their roads?—They dig it from quarries; it is the limestone formation there, but as it is some little distance to the quarries, they do not go very often, and the roads are in a very bad state; it is a soft material at the best.

327. Are there any mills below your mill and the junction of the Kennet with the Thames?—Yes, several; there is one paper mill just burnt, and there are three or four others.

328. Where is the arable land situated that you say has been flooded recently; is it below your mill, or above it?—It is running parallel with the stream after it leaves my mill.

329. Then it is below your mill?—Just below.

330. Do you think that any of the mills below contribute to obstruct the stream?—Not so much as the natural obstructions, because if we could only get the water to the mills they would be obliged to draw the sluices to let it by. We cannot get it there, because the obstructions prevent it. That is the reason that causes the floods. A very great deal can be done by clearing all the islands out of the River Thames and removing all obstructions to let the water go.

331. But if the mills were not there, would not the flow be more regular and more rapid?—It may be too rapid; you may get rid of the water too fast.

332. Too fast for what purpose?—You might not have any left in a dry summer; you may be without water, which would be very bad.

333. I suppose it would be possible to keep it back?—Yes, by putting in artificial dams where required.

334. Artificial dams for another purpose?—As far as my own interest goes, as tenant only, I should be very glad to give it up next week.

335. Have you a steam-engine?—No; we have a very powerful supply of water; an unfailing supply of water.

336. But is it regular?—Yes, regular and in large quantities.

337. What is the greatest amount of power that you develop?—Mine is a small mill with three pairs of stones, equal, perhaps, to 25 or 30 horse-power; that is all that I make use of, but I have power enough in my little place for 20 pairs of stones; there is body of water enough for it.

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Mr. Samuelson—continued.

338. At certain times, I suppose?—Nearly all the year round. The Kennet is an unfailing stream for water.

339. Is that the case with other mills that you are acquainted with in the Thames Valley?—I have no information of a reliable nature to offer you as to the fall on the Thames.

340. Are they generally dependent upon water, or have they steam-engines as well?—They do not often go in for steam; they have plenty of water; it is the floods that interfere more with their grinding at all times than any want of water.

341. During the whole of last year, do you suppose that all the mills would be able to run?—The floods would prevent them running more than any shortness of water.

342. No matter what the cause may be, if they are obliged to stop, during what portion of the year are they able to run, do you suppose, in the average of years?—The floods generally come in November, and they last from December until the end of February, generally speaking.

343. Are they stopped during the whole of that time?—No, not very often; it is a very great exception when it is so.

344. Are they stopped for want of water in the summer?—No, the Thames is a good stream. The short water mills are those on the tributaries, where of course there is not so much body of water.

345. That is not the case as regards the Kennet?—Not at all, nor the Thames.

346. With regard to the other tributaries that you are acquainted with, is it the same?—We will take the Windrush. I know that, and the Ock, and the Tame, and the Coln; all of those I know; and also the tributaries of the Kennet I know. I am well acquainted with both the Kennet and the Thames; I may say from their rise to their fall.

347. There they have two things to contend with; floods at one time, and shortness of water at another?—Yes, but they do not flood as we do, they have not the body of water. What applies to the Kennet and the Thames as regards obstructions and the disgraceful state of the river, as I may term it, applies to the tributaries, they are all blocked up. If you will allow me to say so, supposing the tributaries were to be all cleansed thoroughly, we should have a great many higher floods than we get now. If you could induce people to clean out their water-courses, we should get far worse floods in the Thames Valley. The water would come down so much quicker.

Chairman.

348. But you were suggesting that the tributary, the Kennet, with which river you are most acquainted, should be dredged in order to prevent floods?—Yes.

349. Do you say that that would prevent it in your valley, but would contribute more to floods in the valley of the Thames?—No; not if the islands are taken out. After the Kennet runs into the Thames at Reading, if the islands which so stud the river from Reading to Twickenham were all taken out, and all other matters obstructing the water way; I am not so much afraid in the case of the mills, as they are under proper control and proper regulation; I do not say that all are; but I think with reference to

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the locks, Sir Charles Russell asked a witness this morning that question about hatches being fixed into the locks to draw; that is the case on the Kennet and Avon Canal, but the people are not there to draw them. There ought to be inspection or supervision to see that that should be done.

*Mr. Samuelson.*

350. You think that there should be some general authority for the Thames and its tributaries?—Yes, I do indeed; it is no good leaving it to local parties.

351. It would not be well, you think, to undertake any portion of the works merely; but that all the works should form part of a general scheme?—Yes, I think so; it is a very simple scheme to clean out the channel if we want to get the water off the land, and to make a drain, but it is no good making a drain if we block it up again directly.

*Mr. Richardson-Gardner.*

352. With regard to an answer of one of the witnesses this morning, that the mills themselves form such an obstruction, that they tend to increase the floods; is that your view?—No, that is not my view.

353. You know the mills well up and down the Thames?—Yes, on the Thames and the Kennet too.

354. Supposing that there were exceptional cases, those would not affect the increase of

*Mr. Richardson-Gardner—continued.*

floods at all?—There are certain artificial dams; but they are under control, because they have sluices; and tumbling bays that have been spoken of, that send off the surplus water very effectively, because they are self-acting.

355. Do the millers use all the means in their power for the purpose of carrying the water off?—As a rule they are obliged to do so. When the flood is on, and when they were short, they would be only too glad to bay the water back.

356. Have not the dams which they put in a great deal to do with it?—Certainly not; not to that extent. Of course, anything that is an obstruction, whether it is an artificial or a natural dam, must do so, but I maintain that it is the natural dams that we are suffering from.

357. But the dams must contribute; do you agree with what was suggested that the millers had better all be bought up?—I think not for this reason, if you remove all the natural obstructions, you must then put in some artificial ones. You cannot hold enough water in certain places where you deal with a great fall, because the country would be drained of water. In case of long continued droughts, it may be unwise to allow the water to run away too fast, and irrigation would be prevented also.

358. Then, in your opinion, it would not be desirable to buy up the millers, but that you should get an Act of Parliament for the purpose of relieving the Thames?—I think so. Clear the river out, and that is all you have to do.

*Monday, 14th May 1877.*

## MEMBERS PRESENT :

Colonel Carington.  
Mr. William Cartwright.  
Mr. Coope.  
Mr. William Henry Gladstone.  
Sir Trevor Lawrence.  
Mr Charles Praed.

Mr. Richardson-Gardner.  
Sir Charles Russell.  
Mr. Samuelson.  
Mr. Walter.  
Mr. Watney.

OCTAVIUS EDWARD COOPE, Esq., IN THE CHAIR.

Mr. ROBERT SAMUEL HAWKINS, called in; and Examined.

*Chairman.*

359. You are Town Clerk of Oxford, are you not?—I am.

360. And a solicitor in considerable practice?—I am; but I appear here as secretary of the Thames Valley Drainage Commissioners.

361. Have you been secretary since 1871?—I have been secretary from the commencement. I was the solicitor engaged in bringing the Bill into Parliament.

362. Your attention has been directed, has it not, to the floods in the valley of the upper Thames?—Yes.

363. The whole length of the jurisdiction of the commissioners?—Yes, the whole length of their jurisdiction.

364. Will you state from what points?—I may state that, perhaps, it would assist the Committee if I said that the object I fancy of my evidence is rather to state the facts as to the government of the rivers than as to the floods themselves. I do not profess to deal with the floods. I am not an engineer, and I simply propose to give evidence as to the constitution of the authorities, and in the way in which the whole thing has been managed and is managed at the present time.

365. Will you tell us, as regards the jurisdiction, from what point to what point does it exist?—Beginning at Thames Head, in the parish of Kemble, in the county of Wilts, it goes downwards to Long Wittenham, in the county of Berks. It takes in the tributaries, the Churn from Cirencester, the Swill Brook, the Colne, the Cole, the Ray, the Windrush, the Evenlode, the Cherwell, the Ray, a tributary of the Cherwell, and the Ock.

*Sir Charles Russell.*

366. Where is Long Wittenham?—Long Wittenham lower boundary is between Clifton Lock and Dorchester, near Day's Lock; the lower boundary of the parish of Long Wittenham is the exact definition of the termination at the lowest end of the Commissioners jurisdiction in the valley.

*Chairman.*

367. Will you tell the Committee the course which the commissioners have taken?—I may,

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*Chairman—continued.*

perhaps, be allowed first to give you the mileage of the rivers affected, as computed from the one-inch Ordnance scale. The River Thames itself, from Thames Head down to the lowest point of the Commissioners' jurisdiction is 60½ miles. As to the other rivers, there are 20 miles of the Cherwell, that is the longest length; and the total length of the rivers, including the Thames and its tributaries is 130 miles.

368. The length of the Cherwell is more than 20 miles; where do you stop?—We stop at the parish of Steeple Aston, on one side of the river, and Upper Heyford on the other; it is in fact the neck of the valley before it widens out towards Banbury. The total area of the land included in the jurisdiction as rateable is 55,472·933 acres. The lands over which we have a limited jurisdiction, as being included in previous enclosure or drainage awards, is 11,120·983 acres.

369. Are those 11,120 acres rateable?—They would be *sub modo*. If the different drainage authorities chose to surrender their powers to us, we should at once be able to deal with the whole of the lands; but if they do not surrender their powers, we still have power to do works through their lands, and we have power also to prevent their doing certain works which would interfere with the river; those districts are shown on the map by the colour brown (*delivering in a map to the Committee*). The lands which I gave you, in the first instance, as the rated area, are tinted pink on this plan, and are all within a line five feet above the flood line. Then the margin of lands tinted green on the plans is also within our jurisdiction, and represents closes which have been bisected by the five-foot line, or other lands which the commissioners and the Enclosure Commissioners consider it desirable that the commissioners should have jurisdiction over, for the purpose of making cuttings through, or for other purposes, and those lands amount to 28,441 acres.

*Mr. Samuelson.*

370. How was the flood line determined?—The flood line was determined by levels taken by the Ordnance Survey Department, based

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based on the floods of 1872 and 1873, I think it was. The actual flood marks were made the whole way up the valley by the Ordnance engineers; they took the marks and those marks exist on certain points now.

Mr. W. H. Gladstone.

371. At what intervals were those marks?—I can not say the exact intervals, but wherever there was least cause of difference in the floods, such as a lock or weir, a fresh level was immediately taken, and all the flood levels were also marked besides on the locks on the weirs and on the different obstructions.

Chairman.

372. Do you know who was the officer employed at the time?—Captain Ferrier, R.E., was the Ordnance officer that was in charge, and I believe that Captain Wynne, R.E., was in charge of the levelling. Captain Ferrier was responsible for the survey, I believe, and Captain Wynne for the levels.

373. Then do I understand that the land which is rateable and the object of this Act is the land which is between the river and the Ordnance mark 5 feet above the floods?—That is so.

374. The catchment basin, of which the rivers within the jurisdiction of the commissioners take the rainfall, is about 1,300 square miles computed from the inch Ordnance map.

Mr. Samuelson.

375. Why did you stop at Heyford; why did not you go further up the Cherwell?—Because the Act was not a very easy Act to pass. It was one of entirely a novel character. I believe that no such private Act had been passed, and we felt that as the people up above a certain district had had no real interest in the matter, it was unwise in the people in the Thames Valley to, as it were, make a raid higher up, and that it might lead to great opposition and difficulties in passing their Act. There is a power in the Act contained for persons on the river having lands adjoining the jurisdiction of the commissioners, to come in and take the benefit of this Act by means of a petition to the Inclosure Commissioners.

376. So that the Inclosure Commissioners have full power to determine how it shall be?—They have full powers. If a certain number of assents are given by the owners of those lands and other persons to a petition to the Inclosure Commissioners, the Inclosure Commissioners might order that they should be formed into a separate district, and that they should have all the powers of the Thames Valley Drainage Commissioners over that district.

Chairman.

377. What is the next point you would wish to inform the Committee upon?—I think that perhaps it would be better if I were to state in order the proceedings of the Commissioners to account for the time which has already been spent now that I am on that point. Their Act was passed in 1871. As soon as it was passed they applied to the Inclosure Commissioners for advice as to the best means of having the limits of their jurisdiction under the Act set out. The principle of the Act was that a number of parishes were scheduled, and that the first duties of the Commissioners who were named in the Act, and who were called the first Commissioners, was to define out of those parishes which had been

Chairman—continued.

named such lands as might be improved by relief from flood or otherwise, by the works which they were authorized to do by the Act, and they had, therefore, to lay down, on the maps and plans, the whole of such lands, and then to divide them into districts for the purpose of forming district boards, and when the whole of that was done they were to make their first order declaring the limits of jurisdiction, declaring the divisions into district boards, and stating the number of persons who were to be on each district board, and the number of the final elective commissioners. The district boards, when elected, were themselves to elect the fixed number of commissioners from each district board to the central body, the central board of commissioners being the one authority for purposes of arterial drainage, with the exception of the rivers in Wiltshire and Gloucestershire, which were in an exceptional condition. The district boards were to have no power to touch the bed or the soil of the Thames or its tributaries without the consent of the Thames Valley Drainage Commissioners, that is the central board.

378. How many commissioners are there?—There are now 25.

379. Of those 25, how many are elective?—The present commissioners are all elective. To go back. On the application which I have before mentioned by the Commissioners to the Inclosure Commissioners they advised the Board to apply to the Office of Works, and the Office of Works ultimately agreed with the Commissioners to allow the Ordnance Survey Department to make the surveys and plans, and take the levels for them, and make books of reference of the owners and occupiers, for the sum of 1s. per acre. The Ordnance Department expressed their opinion that the whole of these plans would be done within a little over a twelvemonth, and on that information the Commissioners arranged the estimates, and obtained an Order from the Inclosure Commissioners extending the time for making their first Order, (which was limited in the Act) to the 24th of July 1874. The Ordnance were greatly delayed by the floods and the snow, and it became perfectly clear in 1873, that the plans would never be delivered within the time. The commissioners therefore had to apply for a second and amending Act, extending their term. In the result, the plans with the parish boundaries, and everything marked on them, were not completed and delivered until June 1875.

380. How long were they occupied?—The Ordnance Survey was commenced in the winter of 1871.

381. Have you a copy of the Ordnance Survey?—I have not a copy of the large scale, but I have one or two photographic reductions; there are 240 plans on the large scale, and they had to deliver, besides, photographic reductions, and those are the photographic reductions from which that large map, which I have shown the Committee, has been tinted (*delivering in the same*).

382. I think you stated that that tinted pink is rateable land, and in accordance with the Ordnance Survey?—Yes.

Sir Charles Russell.

383. What is the land marked green on this plan?—The land marked green is the fringe of lands or closes which were bisected by the 5-foot line, and which were put within the jurisdiction of the commissioners.

384. Those

*Mr. William Cartwright.*

384. Those are the lands constituting the 28,441 acres, are they not?—Yes.

*Mr. Charles Praed.*

385. How are the 11,120 acres, under previous awards, marked on these maps?—They are tinted brown on these maps, but there appear to be none on that map which is before the honourable Member. Having received the whole of the plans, the commissioners immediately proceeded to make their first Order defining the limits of jurisdiction, and dividing the lands into district boards. They first of all petitioned the Inclosure Commissioners, and the Inclosure Commissioners sent their inspector to settle those limits. He held meetings at certain places, to hear whether there were any objections as to the inclusion of the lands, and as to the boundaries of the districts. Eventually he made his report, and the commissioners made their first Order, and that was dated 7th June 1876, and was confirmed by the Inclosure Commissioners on the 15th June 1876. That is one of the copies of the Order (*delivering in the same*).

*Chairman.*

386. I see it was to take effect from the 24th of June?—Yes.

387. And those district boards, I presume, in consequence of that order have been formed?—Those district boards were elected and the districts boards elected commissioners, and directly the commissioners were elected they set to work to consider what should be done with regard to devising a scheme for the drainage of the valley. The first step taken was this: There were some engineers who on their own responsibility had drawn up a report upon the valley. The commissioners referred that report to the different district boards, and asked them to consider their recommendations and to report upon them.

*Mr. Samuelson.*

388. Can you state the names of the engineers?—Messrs. Falkiner and Tancred, of No. 1, Westminster Chambers.

*Mr. William Cartwright.*

389. Did they do that at the request of the commissioners?—They applied for leave to the commissioners to see their plans and to make a report, the commissioners gave a general leave not to them but to any engineer. They passed a resolution that any engineer might do it, and those two engaged to do it.

390. They made no tender?—No, there was no tender; they simply did as any other engineer might have done.

*Chairman.*

391. And those gentlemen supplied plans?—No, they supplied no plans; they simply made a report, based on the existing plans of the commissioners, and their own personal examination of the rivers and lands, without going further. It was a report which could not be and was not intended to be a working report, but simply a general report on what in their opinion ought to be done in the rivers.

392. Have you a copy of that report?—I have; it is dated the 28th of July 1876 (*delivering in the same*).

393. Having received this report from the engineers, what was the next step which the

*Chairman—continued.*

commissioners took?—They referred that report to the district boards for their consideration. The report was dated the 28th of July 1876, but it was some time after before it was really put before the board. That was the original report that they made, and they reconsidered some parts in it, only it retained the same date; it really did not come before the board until much later.

394. What action have the district boards taken upon it?—The district boards have taken the matter into consideration. Some of them were unable to make any report; the floods came on and they could not deal with the land; they could not go over it; some of them made a report, but I may say that one district board said that they did not feel competent to express an opinion (if really amounted to that); it was more an engineer's question, in fact the reports were not complete. I could put in the reports themselves; I could hardly say what the results of them all were. Some reported in favour of some of the works and recommended their being carried out; I think No. 2 Board, the Lechlade Board reported in favour.

395. Can you tell me any other board that reported favourably?—I think No. 5. The reports were hardly sufficient to say whether they were in favour or not in favour; they were in favour here and there, but there was no direct statement: "We advise you to adopt the report," and so on, but it was rather "such and such works seemed to be necessary;" but generally it was "these are more matters for an engineer." I am almost afraid, in the absence of the report, to state what were their exact terms.

396. May I say that generally the reports of the district boards were indefinite?—Yes; as to the employment of Messrs. Falkiner & Tancred, the district boards did not say that they should be employed.

397. Did any of those boards express a willingness to be rated for the purpose of works which would prevent the floods?—Every one of the boards reported in favour of works being done, and they were very anxious that they should be done.

398. But did they express a willingness to be rated for the purpose of carrying out those works?—I do not think they expressed an opinion upon that subject, because they knew that if the works were done they must be rated for them. It followed, as a matter of course, if the works were done they must be rated; the work could not be done without their being rated.

399. Then I understand that the reports of the district boards were to the effect that they intended that the works or some of them should be carried out?—Yes, and all were in favour of the drainage works in the valley being carried out. No. 6, the Cherwell District, which is a very important district, was most anxious to get the drainage effected in the district. The part of that district most interested is Otmoor on the Ray, in Oxfordshire, but it includes the Cherwell; the Ray runs in the Cherwell.

*Mr. William Cartwright.*

400. Where does the Cherwell Board sit?—They sit at Oxford generally; they met, in the first instance, at Islip; but I think they found it most convenient to sit at Oxford.

*Mr. Charles Praed.*

401. The Ray, if I am not mistaken, runs up towards Bicester, through Otmoor?—Yes, that

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is the Ray and the Otmoor district; the Ray joins the Cherwell at Islip.

402. It is not the Cherwell proper; the Cherwell proper, I see, is the one running up to Banbury?—Precisely so. Then eventually the Commissioners consulted Sir John Hawkshaw to the extent of simply asking him what his charge would be for proposing a scheme for the drainage of the valley and the lands within the limits of the jurisdiction of the commissioners.

Chairman.

403. What was the result of that application?—The commissioners, finding the movement which was being made throughout the Thames Valley to get a Committee appointed, which resulted in the appointment of this present Committee, and also of a Committee of the House of Lords, resolved to suspend, for the present, negotiations with Sir John Hawkshaw; but when they did so, they gave their sanction to two of the boards proceeding with their works on their own tributaries.

Mr. Charles Praed.

404. What boards were those?—No. 2 and No. 4.

Chairman.

405. What districts are those?—One is called the Lechlade district, and the other the Northmoor and Cumnor district, which includes the Windrush; the important point is at the Windrush.

406. When was that sanction given?—It was a very short time ago. I think it must have been since this Committee was moved for, or very shortly before, if it was not since. It was at the same time that they suspended negotiations with Sir John Hawkshaw.

407. Then do I understand from you that though this Drainage Commission was formed in 1871, up to this time no works whatever have been commenced?—The only work that I believe the commissioners have done was the widening of the bridge at Islip, in fact, it was rebuilt entirely, in order to give an increased waterway.

408. At what date?—It is about a year ago since they first began it, but it was under special circumstances. The fact was this. The county of Oxford had indicted the Ecclesiastical Commissioners for the non-repair of the bridge, and the Thames Valley Drainage Commissioners said, "Well, if you must spend money in repairing this bridge, we should prefer to pull it down if you will contribute towards rebuilding the bridge." The Ecclesiastical Commissioners offered to give a certain amount towards it, and thereupon the Thames Valley Drainage Commissioners had the bridge pulled down, and a new bridge built, and that has already had a good effect upon the district, even without doing any other works. It is rebuilt, but the parapet is not put up, because the floods have prevented the centres being knocked away.

Mr. Charles Praed.

409. Do you know the increase of area which that has given under that bridge compared with the old one?—I should think quite double, but I have not the plans with me. Of course it was not in the power of the commissioners to commence any large works until their plans had been completed, and they had made their first order and got it confirmed, and that, as the Committee will

Mr. Charles Praed—continued.

see, was not till the 24th of June 1876; so that they could not do anything, they had no right to do anything before then, through no fault of their own at all; on the contrary, most urgent pressure was put upon the Ordnance to get the plans completed, and every effort was made to get the work done.

Chairman.

410. Then they have used all despatch in carrying out the works?—Yes, every pressure was put on the department to get this work done. No time has been lost at all, and it has been a cause of as much vexation to the commissioners as to any one that they have not been able to get on faster.

411. In this map which you have furnished us, is the town of Oxford included within the pink?—No; the town of Oxford is exempt; all houses are exempt from rating.

412. Are none of the houses in Oxford affected by the floods?—Yes, they are.

413. Does it appear reasonable that where houses are affected seriously by floods that they should be exempt from rating?—It was considered at the time that it was purely an agricultural question, and that very considerable difficulties would have arisen if we had tried to include the towns and the question of health within that Act, and it was considered that it would be better to leave that question alone, at any rate in that Act. That was the conclusion which the promoters of the Thames Valley Drainage Bill came to in 1871.

Mr. Charles Praed.

414. I gather from your answer that you expected great opposition to your scheme if houses had been rated?—I have not the least doubt that we should have had.

Chairman.

415. Do you apprehend that the same opposition would now be given to any Act that should compel houses to be rated?—I am not sure that it would; my own impression is that under certain circumstances the towns might consent to some kind of rate in aid or contribution.

Mr. Samuelson.

416. What is the limit in money to your rating powers?—We have no limit in money.

Mr. Charles Praed.

417. In fact, if the rent of an acre is 2*l.*, you would be able to put 35*s.* upon that acre?—We could; but the landowners are the rating authorities, and that was considered a guarantee that they would not do any such thing.

Chairman.

418. In your opinion should the houses that are affected by floods be required to pay a rate in aid?—That is a very difficult question for me to solve, but I think it is reasonable under certain conditions that some contributions should be made by the towns. How that contribution is to be exactly arrived at I hardly like to say, but I can imagine that it might be put in such a form as to be rendered acceptable to the towns after the serious results which have come from the late floods. In Oxford we are very little materially affected by the flood, that is to say, the flood does not

*Chairman—continued.*

not come up to the houses to any great extent. In a small portion of the town no doubt it touches the houses and floods the cellars, but it is not to any great extent. Oxford lies on rather a high tongue of land between the Cherwell and the Thames, and the houses, most of them, are high and dry above the floods; but of course there is the question of the general enjoyment of life being greater, and even a bright state of health being greater, if the damp around is reduced. I think that many people would feel that.

419. Then are you above the five feet mark at Oxford?—Yes; the bulk of the city of Oxford is considerably above the five feet line; there are portions of Oxford called St. Ebbes, and Jericho, where no doubt they would be below the five feet line. I think on that point I would say this that among a many people in Oxford there is a strong feeling that Oxford is a very healthy place, and there is no doubt that it is a very healthy place, and they point to the fact that the river-side people are some of the strongest, healthiest, and oldest in the population; but I think that there is just this difference between things as they were and things as they are, that the sedentary habits of the population and the number of people leading sedentary or indoor life are very considerably increased, the mode of life is very different from what it used to be, and I think that generally the great heaviness and damp in the air does tell upon people leading sedentary lives, and gives a sort of languor which might not be if the atmosphere around was a dry one.

*Colonel Carington.*

420. What has caused this change?—I can only say that I believe that habits of life have greatly changed; the education of the young tends the same way. There is much less outdoor life, and much more indoor life than there used to be; many more clerks and shopkeepers, and so on; there is a great deal more indoor life in proportion, I think, than there used to be; the population has considerably increased in density there also.

*Mr. Richardson-Gardner.*

421. It is suggested that possibly some householders would not object to be rated, do you draw a distinction between those below the five feet line and those above; one can imagine that those who are swamped by the flood would not object; but that others higher up, and not at all affected by it might; do you draw any distinction between the two?—I am not speaking for the citizens of Oxford at this moment, but I think if the citizens of Oxford, taking them as the whole, considered the question, and said that they thought it was desirable to assist in reducing the flood level in that district, I think they would not regard it as a question of a particular house being flooded, but they would look at it as a broad question, affecting the whole community, and would say, "Well, under the circumstances, if it be a benefit to so many poor people it will benefit all of us, and we will consent to some contribution, or some rate in aid, a lump sum which we will contribute." I think, if the river authority went into the question as to Oxford at all, it would take this kind of form; they would say to the local board "We think you ought to contribute such and such a sum out of the rates towards the work."

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*Mr. Richardson-Gardner—continued.*

That would be, I think, the form in which the proposal would have to be made. I do not think it would be possible to go upon the question of rating one house or another house.

*Chairman.*

422. As regards the healthiness of Oxford the Dean of Christchurch, on Friday, stated that it was a tolerably healthy place, but still that when persons get ill they are obliged to go away to recover, because from the general low state of the health of Oxford they could not recover; is that your opinion from your knowledge?—I think it has been, perhaps, a good deal so this last year, because there has been an immense amount of rain, and I think that people who have caught bad colds or suffered from other illnesses do find a difficulty in throwing them off and regaining strength without going away.

423. Do you mean when Oxford is flooded?—No, I do not say when Oxford is flooded, but after a long period of wet weather such as we have been having. I do not say that that may not apply with equal force to any other town, or that a mere change of air might not be all that is needed to throw off a long-continued cold or regain strength.

424. Supposing there were a scheme by which the whole jurisdiction of the Thames and its tributaries should be put under one body, absorbing the Drainage Commissioners, in your opinion, how would such a jurisdiction or conservancy act?—I may be considered an interested person in this, but I venture to think that it would act very badly. If the Committee would allow me, I would state what took place when the Conservancy did attempt to become the drainage authority, and I think perhaps that may assist the Committee in arriving at some conclusion. In 1866 the Thames Conservators were first made the authority in the upper river; that is to say, from Staines down to Cricklade; and all the works of the old Thames Commissioners and all their rights and powers were vested in the Conservancy. The Conservators were 23 in number, consisting of, by that Act, the Lord Mayor of London, two aldermen, four common councilmen, one deputy master of the Trinity House; two to be elected by the Lords of the Admiralty, two by the Board of Trade, one by the Trinity House, six by the shipowners and other persons and corporations connected with the shipping interest of the Port of London, and four by persons qualified to act as Commissioners under the Acts relating to the navigation of the Thames from Staines to Cricklade; so that there were 19 people in London and four elected Commissioners of the landowners; and then the Conservators, being constituted the authority in the upper river, put forward a scheme for altering, deepening, and improving the river from King's Weir, which is above Oxford, to Sandford.

*Mr. Samuelson.*

425. When was that?—The report was dated the 9th of January 1869.

426. What was done with that report?—I believe it was sent to different people, but the report never was carried out. The outlay which the engineers and Conservators estimated for this work was 38,458 £.

427. For how many miles was that?—It would be about 4½ or 5 miles.

428. Nearly

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Mr. Samuelson—continued.

428. Nearly 40,000 *l.*, upon 4 or 5 miles?—Yes, to be spent on that district. I find on measuring I was understating it; the total length of this part of the river is 7 miles and a few chains.

429. How were they going to get the money to do this?—It was said that 11,200 *l.* should be charged to the navigation, and the remainder, 27,258 *l.*, was to be charged on the lands.

430. How much an acre would that have been?—I should say that this report was put forward, but they never said in the report how the money was to be raised, but they brought a Bill into Parliament that Session in which they proposed to schedule a number of parishes beginning at St. Simpson, Cricklade, and St. Mary Cricklade, and going down to Clifton Hampden in the county of Oxford.

431. In that Bill did they take any powers to levy rates?—They took a power to levy on such of the upper district lands as should be, for the time being, benefited by the Conservators putting in force the powers for the upper district of 40 *s.* per acre, and payable in 10 years, and by such instalments as the Conservators should direct.

432. How was it to be determined what land was benefited?—It rested apparently entirely with the Conservators subject to arbitration. If any one thought himself aggrieved by the order of the Conservators to pay that acre tax, the question was to be left to the decision of an arbitrator to be agreed on between them.

433. What became of that Bill?—Immediately this Bill was brought forward, the landowners joined and opposed it. The petition was signed by almost all the landowners from one end of the district which the Conservancy attacked to the other, and they opposed the Bill, and the Conservators eventually withdrew the obnoxious clauses.

434. That is to say, the clauses giving them the power to tax the lands?—Yes.

435. Was anything substituted for them?—Then the opposers subsequently formed themselves into a committee of promoters to get the Thames Valley Drainage Act passed, and it was passed in 1871. A very strong objection to the Conservators attempt first of all, was the fact that the Conservators were already practically entirely connected with London interests, having no interests whatever in the upper valley, and also the fact that they took power without defining any lands whatever to levy a 40 *s.* acre tax upon the whole riparian parishes.

436. Subject only to arbitration?—Subject only to arbitration. Then another difficulty was this, that the Conservators had no power to do anything except in the Thames, and their powers were solely limited to navigation purposes. They proposed, to do the work the proportion of cost of which chargeable on the lands alone as by the original estimate of the engineers came, as has been seen, to 27,258 *l.*, in a district from King's Weir, a little above Oxford to Sandford, and taking the rateable area which the Thames Valley Drainage Commissioners now have ascertained the whole rateable area, including an area half a mile above King's Weir, and three miles below Sandford Lock, would only be 5,778 acres, so that 40 *s.* an acre on that district would only have raised 11,556 *l.*, and their scheme

Mr. Samuelson—continued.

was to spend 30,000 *l.* on a district three-and-a-half miles less in length.

437. In order to carry out this improvement they would have had to tax the land to the extent of 6 *l.* an acre?—Yes, if they could have done it.

438. By means of those works would the drainage have been improved?—I am not in a position to answer that question; there have been various opinions, and I believe that other witnesses may be able to give you information upon that subject, whether or not it would have been improved. The opposition of the landowners was as to the impracticability of the scheme in point of money, and to the fact that the Conservancy were not, in their opinion the, body which ought to have charge of the drainage of the lands in that valley.

439. You spoke of the constitution of the present Conservancy Board, but if greater weight had been given to the landowners, do you think that it would have been possible for the Conservators to carry out the drainage of the Thames Valley and its tributaries efficiently?—I think even if they had, there would have been a grave objection; I think that the landowners in the upper valley would have much preferred having the matter under their own management. They are the persons most interested, and there seemed to them no possible reason to mix up the jurisdiction of persons dealing with the varied interests down here in the Port of London for navigation purposes, and for lighter purposes, and all those kind of things up to the tideway, and to mix it up with the question of the government of the river, and the drainage in the district above.

440. Then the present state of the case is this, that there are two concurrent bodies, one dealing with the navigation, and the other with the drainage?—There are.

441. Which extend over a portion of the same district?—Over a portion of the same district, with this difference, that the drainage authority has the control both of the lands and of the tributaries, and really an authority over the Thames itself, because they have an appeal to the Board of Trade if the Conservancy object to their doing the work there, and therefore they have power to do works now against the will of the Conservancy in the River Thames, if the Board of Trade allow them.

442. How does that work?—At present no works having been begun in the Thames, it is impossible to say, but it is hardly likely to be satisfactory.

443. I think you stated that the reasons why no works have been begun, is because you were kept waiting so long for the surveys of the Ordnance Department?—Yes.

444. But since those surveys have been in your hands you have been in communication, as you told us, with various engineers, but those communications hitherto have not hitherto led to any plans for the improvement of the works?—Not at present; they were delayed really because the commissioners hesitated to take any steps in the face of the appointment of this Committee.

445. Will you kindly repeat when it was that you got the last of the plans from the Ordnance Survey?—The plans, with the parish boundaries and

Mr. Samuelson—continued.

and photographic reductions, were not completed till June 1875.

446. And we are now in May 1877; during that interval you did nothing?—We had to get our district boards elected, and the jurisdiction defined, and give the necessary notices and make our first order and get it confirmed, and the inspector of the Inclosure Commissioners had to hold his meetings, and a great deal of time elapsed in doing all that work, which, necessarily on a large scheme of that kind, took a considerable time. They were not in a position to do anything until, as I have said, the latter end of last year, when the boards were elected.

447. When was the first meeting of the general body of the Commissioners?—I am afraid that I have not that date.

448. Was it last year?—Yes, it was last year, it must have been a considerable time after the 24th June, because the first order was only to take effect from the 24th June, and then they would have to elect the district boards, and the district boards had to meet, so that it could not have been till quite the autumn last year, before the first meeting of the Commissioners took place.

449. Then did you set to work to consult engineers?—Yes.

450. You did not adopt the plans of any of those engineers I believe?—No, we did not. I may say that the report which was made by the two engineers was not a complete report, not a report upon which the Commissioners could have proceeded to do the works. It will be necessary for the engineer, whoever it may be who is entrusted eventually with these works, to take a great many cross sections and to do a great deal of work on the river before he could say positively what the works that ought to be done on the river are, or what their cost will be.

451. Have you appointed an engineer to the Commissioners?—No, that is delayed. As I have stated, the board had some interview with Sir John Hawkshaw, but the negotiations were suspended, pending the appointment of this Committee.

452. What do you expect this Committee to do for you?—I almost hope that the Committee will do a great deal for the Commissioners; there are many things that are desirable. I do not know whether I should be right in going into this, but there is one thing, undoubtedly, which is the question of the loan of public moneys, and the different powers which will be necessary if that power is granted.

453. Have you not power now to borrow money from the Public Works Loan Commissioners?—We have no power in our own Acts to get it from the Public Works Loan Commissioners at present, and we do not do so. I think, judging from what I have recently seen in some investigations which I was able to make upon the working of the Irish Acts, if public moneys are to be granted, probably it would be necessary also to make provision for the mode of repayment of those public moneys, and the assessment of the value on the lands. That system in Ireland is a very complete one, and I believe it now works extremely well, and it might be a question whether it might not be desirable, both in the Thames and other rivers, or any drainage scheme, to apply some of those

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Mr. Samuelson—continued.

provisions simultaneously with making grants of loans of public money.

454. What are the powers under your own Acts in that respect?—The powers under our own Acts to borrow are very large.

455. What is the limit for repayment?—Our limit is 50 years, but then the difficulty is that the land improvement companies and those other companies cannot lend for 50 years, they can only lend, I think, for 30 years, and they do not consider that the powers in our Act authorize them to go beyond their Acts and to lend for 50 years.

456. Is there no general Act under which the Public Works Loan Commissioners would have power to advance you the money for those purposes?—I do not know for certain whether there is or not, or whether it would apply to us, but even granted that there is, I believe special provisions would be needed before the Treasury would lend to the Commissioners.

457. What you would like is a recommendation from this Committee that the Public Works Loan Commissioners should lend you money for your purposes?—Generally so.

458. Is there anything else that you would like to have from the Committee?—I think that there is another question, and that is the question of the contribution of the towns. I think it would be necessary to go beyond the giving mere permissive power to the towns to contribute. The towns have themselves been moving in this matter more than anyone else, and it seems but reasonable that if works are to be carried out, there should be some assistance from the towns in carrying them out, and not that the whole should be thrown upon the land.

459. When you obtained your Act, in 1871, you advisedly limited your powers of taxation to the land?—Quite so; but things have been much changed since then, apparently.

460. You thought that sufficient at the time for your purpose?—We would have liked, of course, to have had contributions from the towns, but we did not think we could get them, and we were obliged to apply to have such an Act as we thought we could carry, and it was no use raising an opposition from all kinds of interests, when we wanted to carry an important Act of this kind.

461. Still the hope that this Committee would do for you what you did not ask Parliament to do before, scarcely justifies your suspending your operations if you were ready to go to work?—No; but there are other questions that are involved. The honourable Chairman put a question to me some time back, as to whether I thought the Conservancy would be the proper power; it would greatly benefit us if this commission, on considering the position of the Conservancy in the upper river, were to say that they thought that the whole of the jurisdiction of the upper river down to the tideway should be transferred to the Thames Valley Drainage Commissioners and a body constituted like them in two sections, and that the authority of the Conservancy should cease, and the navigation and the drainage should be combined; then I venture to say that that would make a considerable difference in the arrangement with the engineer.

Chairman.

462. My question was whether one body of conservancy, I do not say the present body constituted

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stituted as it is, but a body of conservators in which the riparian owners and the local authorities should be fully represented, whether that body, absorbing the Drainage Commissioners, would or would not carry out advantageously the whole jurisdiction of the River Thames and its tributaries?—Yes. I still think that it would be better not to throw the whole under one body. I think that the river is practically capable of being dealt with in sections, and that that works in many cases in Ireland very well. They have the upper part of the river under one body and the lower part of the river under another, and it seems to answer very well; there is no objection to it, and it is much more convenient, undoubtedly, that in a long river like the Thames, those who are immediately interested in the locality, should be the ones to deal with their own locality.

463. Could you mention any river in Ireland where they are under two bodies of conservators?—I take the Inny River, which they are draining now. The Lower Inny was worked out some time back, and the Upper Inny is being done now; and they are placed under different boards, and there seems to be no difficulty about it.

464. Can you mention any other?—I am afraid I have not the names, but I think there are two or three more.

*Mr. Samuelson.*

465. Have there been any negotiations between the Commissioners and the Conservancy on the subject of works?—No, there have been no negotiations on the subject of the works themselves, because the works have not begun. The Commissioners have desired to get some information as to different things that were in the accounts of the Conservancy with the view of ascertaining what the value of the navigation was at the upper end, and the amount of money expended on the upper end, and purposes of that kind. They, therefore, wrote to the Conservancy to get this information, as they considered it a matter of considerable importance to them, but the Conservancy declined to give any information.

466. In what way would that information have been important to you, if you could have obtained it?—The feeling in the upper river is this: that the interests of the landowners are really considerably sacrificed to the navigation interests, so far as the Commissioners are aware, there really is hardly any navigation above Oxford, which is of any importance at all, and whatever there is they believe might safely be entrusted to them, with power to keep it up, and our object in getting this information was to see how far they were justified in this view of the case. They went into the accounts, and a letter was written to the Conservancy on the basis of those accounts asking for the particulars, which letter I have here. The accounts were first summarised, showing the whole of their accounts, and what they had expended during the whole time; and it was seen from the accounts that apparently very little of their money had been spent above Oxford; or in the jurisdiction of the Commissioners, and that they did not know how much of it had been spent, as the accounts were not sufficiently explicit. So they wrote to the Conservancy a letter of which I have a copy here, it is dated the 2nd January 1877, and is as follows: "Referring to the accounts of

*Mr. Samuelson—continued.*

"the Conservancy, published and presented to the House of Commons, under 20 & 21 Vict. c. 47, I am directed by the Thames Valley Drainage Commissioners to ask the Conservators to be so good as to afford them such information on certain parts of income and expenditure. "Taking the upper river accounts from January 1867 to December 1875, it appears that the Conservators have spent in rebuilding and repairs of locks and weirs the sum of 67,121*l.* 16*s.* 10*d.* "In the capital account it appears on what locks and weirs 40,641*l.* 8*s.* 5*d.* of this sum was spent. "This leaves a sum of 26,480*l.* 8*s.* 5*d.*, in respect of which the particulars of the expenditure are not given. Can the names of the locks and weirs on which this was expended and the amount apportioned to each lock or weir be given? Next, during the same period, there was expended for purchase of plant and steam tug 2,834*l.* 6*s.* 6*d.*, wages to crew and repairs 2,399*l.* 11*s.* 10*d.*, making a total of 5,333*l.* 18*s.* 4*d.* Can you state if this steam tug has been employed above Abingdon, and for what periods? Secondly, What were its earnings? The dredging during the same period amounts to 3,172*l.* 2*s.* 9*d.* What portion of this cost represents dredging done above Abingdon? Then the awards for compensation have amounted to 6,346*l.* 17*s.* 2*d.* Can the different places at which the rights, in respect of which the compensation was given, be furnished with the sums apportioned to each place? On the credit side, it appears that the Conservators have received 35,566*l.* 15*s.* 4*d.* Can the above amount be divided, so as to show the amount of tolls taken at each lock? "The Commissioners would be greatly obliged if the Conservators would authorise you to furnish them with the above information." The answer to that was dated the 13th of January, and is as follows: "I have laid your letter of the 2nd instant before the Conservators of the River Thames, who direct me to state in reply thereto, that their accounts have been published in accordance with the requirements of Parliament, and that they must decline to comply with the request made by you for details of works executed, and explanation of items of expenditure." In the report of Messrs. Falkiner and Tancred, considerable reference was made to the state of the weirs. It was shown that those weirs were very much out of order, and that it would be an essential thing for the Thames Commissioners to enlarge and restore and repair those weirs, and it was very desirable, therefore, for the Commissioners to ascertain how they were to divide or how they were to apportion the amount of expenditure between the Conservators and themselves on all those weirs, and the question of account will be continually one which will hereafter enter greatly into the questions between the Conservators and the Thames Valley Drainage Commissioners. We believe that the weirs in many places are in an extremely bad state, and will require a very large expenditure upon them; we think that a great deal of that work really is the duty of the Conservators, while, at the same time, we shall have no doubt to pay for the extensions of the weirs; and therefore all those questions of the amount of tolls, and so on, enter very considerably into it. We only want to get this question well considered, because we cannot help thinking that the solution of

Mr. Samuelson—continued.

of the thing will be a transference of the upper river to the Commissioners.

467. Your point is that the works of the Conservators for the navigation are an obstruction to the drainage?—An obstruction to the drainage, and not only that, but they have been neglected. The whole bed of the river above Oxford, the whole upper river, has been so neglected that in summer weather the Conservators do not get the barges down except by the system of flashing. They could not get the barges down in dry weather unless there were these flashes, which means holding the water back. The barges, in fact, buy a flash, and then they ride down on the flash, all the way to Oxford or wherever it may be. In this report of Messrs. Tancred and Falkiner it says, "Between Sandford and Abingdon Weir, with the exception of a portion near Radley, and at the site of Old Nuneham Lock, the river is generally sufficient for the drainage, and the area of lands affected by flood is confined to a comparatively narrow belt, which, with the exception of a portion lying on the northern bank between Nuneham Island and Abingdon does not appear to suffer to any great extent. The injury to this part is chiefly caused by the undue damming back of the water at Abingdon Weir, apparently for the purpose of maintaining sufficient depth of water for navigation in the reach above. An examination of this weir shows that its crest has been twice raised in lifts of 9 inches each, the last of which appears to be of comparatively recent date. The inference to be drawn from this is that, as the reach above became silted up, the requisite depth of water was obtained, to the detriment of the land drainage, by raising the crest of the weir instead of dredging the channel."

468. Without the concurrence of the Conservators it is impossible for you to carry out your drainage works efficiently and effectually?—No.

469. You rather look to an absorption of the powers of the Conservancy by your body for a remedy, than to any reconstitution of the Conservancy itself?—Yes, certainly. I may say that, of course, if that was carried out, and supposing that the rest of the river could be put under Commissioners with somewhat the same powers as the Commissioners of the upper river, then, of course, would arise the question of the dealing with the revenue of the Conservancy. The Conservancy have not only their tolls, which I believe decrease, but they have a contribution from the water companies, which I believe increases. The payment made by the water companies is for keeping the sewerage out of the river, and for keeping the river clear; and it seems to us that those powers might be quite as well exercised by the Thames Valley Drainage Commissioners as by the Conservancy Board; that there is no reason why they should not do it; and seeing that the water really comes from the whole of the upper valley, it seems that nobody ought to have the benefit of the contribution so much as the people from whose land it comes. Moreover, the Thames Valley Drainage Commissioners, if they carry out their works, will undoubtedly improve the state of the river. If they dredge it, and if they widen it, as they must, they will create, practically, better reservoirs of water along the whole length of the river, and if the powers of the Conservancy were transferred to

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them for keeping the river pure, keeping the sewerage out of the river, and so on, there seems no reason why the Thames Valley Drainage Commissioners should not have some of the money.

470. If a division of the powers were made in the way you suggest, do you think it is possible that the interests of the lower part of the river might receive any detriment from what might be done by the Commissioners on the upper part?—I cannot see that the lower river could be otherwise than benefited by the change; I am supposing that the district between Wittenham and Staines, or down to the tideway, were put under a board similarly constituted to the Thames Valley Drainage Commissioners.

471. You do not imagine that any works that would benefit the landowners above a certain point would be likely to be prejudicial to the navigation below that point?—No, I do not think so. I think that if the management of the navigation, whatever interests there are, were entrusted to the landowners, they would do their duty as much by those interests as they would by the drainage, that there the need be no fear whatever on that subject.

472. They would be responsible for keeping up the navigation?—Yes, they would do it. I think they would do it as part of their drainage scheme, instead of separating those interests. In Ireland the navigation and the drainage were effected simultaneously under the Acts; the drainage, and the navigation, and the water-power were all the subjects of the first Acts, the Acts that were passed at the Famine time. The Board of Works in Ireland executed the works simultaneously. The consequence was that the drainage works and the navigation works were not hostile to each other and the water-power, but they were all arranged to go together. I can see no reason why, eventually, that should not be effected on the River Thames.

473. Do the Commissioners receive a payment for their attendance?—The Commissioners receive no such payment.

474. The Conservators do receive payment?—First of all, under their first Act, the Conservators were allowed, with the consent of the Treasury, to take for their personal allowance 1,200 *l.* a year. When the Conservators got the Act passed, taking in the upper river, they took power, with the consent of the Treasury, to take 1,800 *l.* a year out of the lower river, and to take 700 *l.* a year out of the upper river, so that they now put into their pockets, for their personal services, 2,500 *l.* a year, representing in ten years the sum of 25,000 *l.*

475. Who is the engineer of the Conservators?—Mr. Leech is the engineer.

476. Is he consulted by the Drainage Commissioners at all with regard to any works which they may be carrying out now?—Not at present, I think.

477. Have any of the Conservators visited Oxford?—I am not aware. We never hear anything of them. Personally, I have never heard anything of the Conservators coming to Oxford. I believe they have come occasionally, because there is an item of private travelling expenses there put down, so that I suppose they come up the River Thames. They have charged the

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upper river in the nine years 1,227 *l.* for personal travelling expenses.

478. You mean the travelling expenses of the Conservators?—Yes; the Conservators' travelling expenses are separate items, and they amount in the nine years, on the Upper River Fund, to 1,227 *l.* 5*s.* 9*d.* The superintendent and his travelling expenses are different altogether; that is another item; those in the nine years amount to 3,039 *l.* That is his salary and travelling expenses.

479. I suppose, if they had been at Oxford frequently, you, as town clerk, or as clerk to the Commissioners, would probably have been visited by them?—I do not think so. I do not think they would come to me much. I should say that the Conservancy, since they have had the upper river, are in this position, which position is, of course, a matter for consideration. They took to a debt by the old Thames Commissioners of 88,000 *l.* at 3 *l.* 10*s.* per cent., but that, of course, is subject to any debt they may incur. They have incurred a debt of over 40,000 *l.*, so that the whole charge on the tolls and revenues of the upper river amounts now to over 120,000 *l.*

Mr. William Cartwright.

480. Have they contracted this by way of mortgage, or by bonds?—They have received from the Public Works Loan Commissioners 40,000 *l.*, and they borrowed from the lower river account, I think, 4,450 *l.*

481. Do they pay interest on the old debt?—No; there is no interest paid on the old debt; they have hardly enough to pay their expenses, according to their last report. Every report almost which they issue complains of want of funds to do works; they say that they have no funds to do works.

Mr. Samuelson.

482. Is there any form of account prescribed for the Conservancy by Act of Parliament?—They were to render separate accounts for the upper and lower river, and they did render the accounts in a particular form, giving the upper and the lower river; they gave accounts, one of which was the Thames Conservancy Upper Navigation, and the other the lower, an account of the moneys received and expended by the Conservators. After this correspondence took place between the Commissioners and the Conservators, when they refused to give further items, curiously enough, the next report was totally altered in its form. Instead of giving an annual account, as they used to do, they have returned it from the 10th of August 1876 to the 30th of December 1876, giving in a lump account; they did not give it for the year, but it was put into that account. I do not know whether any subsequent account has been published, but the report was in such a form, that it was quite different from what the others had been.

Chairman.

483. Were they annual reports?—Yes, annual reports.

484. Up to what year?—The one presented to the House of Commons the 18th of July 1876 continued the old form of account. The one rendered in this last February 1877 does not render the account in the former form, but lumps the whole revenue of the year's navigation for 10 years.

Chairman—continued.

485. Their annual report is not yet due; that is a supplemental account, is it not?—I do not know; the account is rendered up to the 31st of December. I do not know why it should not have been rendered the same as the others.

Mr. Samuelson.

486. Is the form of the account prescribed by Parliament?—I do not think the exact form is.

487. Are they obliged to render an annual account?—Yes, I think the Act says that they shall render an annual account.

488. Were they in the habit of rendering an account as late as July in previous years, or at what time?—It is by these Acts to be made up to December; it is not ordered to be printed in July, no date is fixed that I am aware.

489. In the previous years, in the year 1875, for instance, what was it?—One was rendered in August, I see; this being an account for 10 years, it must have included the tenth year; the account for last year must have been discoverable.

Mr. W. H. Gladstone.

490. The Dean of Christchurch spoke of the injury done by constant floods to Christchurch meadow; in order to give one an idea of that, can you tell me what the worth of that land is?—I should be afraid to say. It is occupation land, but I should say that its worth has been next to nothing for the last two years. I believe they have had to sow grass there again. I believe in many parts the whole of the grass has been completely destroyed. I do not know what the Christchurch meadow is let at, but of course, if that land was free from floods, one may reasonably expect it would let at least for 6 *l.* or 7 *l.* an acre as occupation land.

491. But you do not know what it is actually let for?—I do not know how it is let.

Mr. Walter.

492. The letting of Port meadow was not affected?—Port meadow is not let. It is a common without stint, and there is no letting of it at all.

Mr. Charles Praed.

493. You alluded to some Acts relating to the Irish Navigation, which you said would be a guide in assessing the rates; what Acts did you allude to?—There are two distinct series of Acts; first there are the old Arterial Drainage Acts, and then there are the Acts which came into operation in 1863. The mode of obtaining money there for drainage purposes is a very complete one indeed, and obviates a great deal of question as to the assessment of land. No doubt one of the difficulties that is experienced under the General Land Drainage Acts in England, and possibly might have been experienced by the Thames Valley Drainage Commissioners, is the assessment of lands and the improved value; and that is a question which has been under the serious consideration of the Commissioners more than once, the question of this assessment being open to appeals, and so on. The system under the Irish Land Drainage Acts is very complete indeed.

494. Is that the Act of 1863?—Yes, it is under the Act of 1863, and the amending Acts founded on it. At the time when any scheme is



Mr. Charles Praed—continued.

is made, the promoter of the scheme, before he goes to the Irish Board of Works, has to show all the plans of the proposed works, and the works necessary for outfall; the lands to be drained or improved; the proprietors and occupiers of such lands; the lands and property required to be taken, or likely to be injured, and the owners and occupiers thereof; the lines, &c., of streams, &c.; to be cleared, scoured, &c.; the requisite variations, &c., direction of new cuts, &c.; an estimate of cost of works, of cost of compensation, and miscellaneous expenses; the actual value of the land; the probable and improved value; and the proportions in which it is proposed to charge the lands with the cost. That is all handed in to the Commissioners of Works before anything is done in the way of drainage, and afterwards the inspector goes down, and when it has been settled, then on this scheme the Treasury begins to lend money for works, according to the estimate of what the works are to be. After the works are completed the inspector goes down, and he checks the award and the proportionate cost, and makes his award after hearing the objections to it, and then the amount is charged on the lands according to that award; that award once enrolled, that settles the question. He also at the same time settles the schedule of assessment for the future maintenance of the works, and then the whole of the rates for those maintenance works and the original works are paid by the owners, and the tenants are made chargeable according to the outlay by the award of the Board of Works who settle what the tenant ought to pay, his landlord for the works which have been done.

495. And they have the power, have they not, to spread the charge over 50 years?—No, they do not charge it over 50 years; they charge it over 35 years.

496. The Thames Valley Drainage Commissioners have in their Act power to charge over 50 years, but the Inclosure Commissioners, or the

Mr. Charles Praed—continued.

Land Improvement Commissioners cannot lend money for that period?—That is so.

Mr. William Cartwright.

497. As to the tolls on the upper river are they decreasing in value?—From the Conservancy accounts I cannot tell because they lump the tolls, and therefore it is impossible to know; and therefore I cannot say whether they are decreasing on the upper river or where it is. I believe there is a decrease in the tolls, but where we cannot tell.

498. The navigation of the upper river, I suppose, is very small?—Very small indeed. There was sometime back a meeting of the traders in Gloucester to try and reopen the navigation, but I imagine that that was a great deal the fault of some of the railway companies who would not make proper terms with them, and as far as I can judge, and I know the experience of some Oxford men who have a great deal to do with the timber trade, in which the Gloucester traders are interested is, that it would be very rare that timber would go by boat in such a long length of river as the Thames. It is not like canal navigation. Canal navigation would be better than river, because owing to the state of flood sometimes and low water at others, and difficulties of that kind, river navigation would not be so good as canal navigation, and in a long length of river it would not pay, and the railways would always beat the canal if they chose to do so.

Sir Trevor Lawrence.

499. Is it not the case that the accounts of the Thames Conservancy cannot, according to the Act of Parliament, be presented until the meeting which takes place on the first of June?—I do not know that. I only see that they presented their account the other day, only it was made up with 10 years lumped together, instead of being made up in one year.

500. I mean the annual accounts?—I do not; I simply find that this was made up for 10 years.

MR. EDWARD WILLIAM HARCOURT, called in; and Examined.

Chairman.

501. You are a considerable landed proprietor above Oxford, I believe?—Yes, both above and below Oxford.

502. And your land lies for some considerable extent along the banks of the River Thames?—For several miles.

503. You are also, I believe, Chairman of the Thames Valley Drainage Commissioners?—No, the Duke of Marlborough is chairman. I am only acting for him during his absence in Ireland.

504. Has your land suffered much from the effects of floods?—A great deal.

505. Have you and the adjoining landowners considered as to what measures should be adopted for remedying this loss?—I may, perhaps, be allowed to state that about 11 years ago some of the tenants on my property came forward with a scheme of their own, saying that the land would be so much improved by certain operations on the river that they should be willing to pay more  
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Chairman—continued.

than they were then paying for their land if such operations were carried out.

506. Did they suggest any scheme, or did you consult any engineer with a view of carrying out such improvements?—In consequence of their representation, a private Act of Parliament was obtained, affecting the country which appears on the map between Eynsham and Newbridge, in the parishes of Stanton Harcourt, and North Moor, which includes a tract of land of some thousand acres, granting us compulsory powers to carry out works over that district. I myself own two-thirds of the land, and the other one-third is owned by the different colleges in Oxford, chiefly, I think, St. John's College, and by other small owners. As soon as our Act was obtained we employed an engineer of the name of Ripley.

507. What was the date of your Act?—1866. As soon as the Act was obtained, we set to work on Mr. Ripley's report, and a bank was constructed  
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structed some miles in length, extending from New Bridge, and down to near Eynsham. That bank was about three feet in height, and there were various culverts and arrangements to allow of the water being let on to the land as well as to let it off the land. This was done at the expense of about 3,000 £, and a great deal of this land, agriculturally speaking, has been much improved in value by this operation. At the time of the publication of an intended Act by the Conservators, there was a great deal of dissatisfaction aroused amongst the landowners in the district on account of the powers proposed to be taken by a London Board to tax us up to 40 s. an acre. We opposed the Bill, and, as Mr. Hawkins has said, we opposed it successfully, at least the rating clauses of the Bill. It was only natural that the question should be asked us whether we were prepared with any scheme of our own. With the experience of the working of the Act of 1866 before us, we then brought in and carried the Act which formed "The Thames Valley Drainage Commission." It was not that we shirked paying the money, but we did not think that the money would be spent to the best advantage by the Conservators.

*Sir Trevor Lawrence.*

508. That was in 1870, was it not?—The opposition was in 1870, and the Act was passed in 1871. That our fears were well grounded, I think, is proved by the Conservators themselves in the reports which they have issued to Parliament. In the 6th section of the Report of the Conservators, 1877, they say: "In 1869 Messrs. Beardmore and Leach prepared a scheme for improving the river and its branches towards Sandford. Had this scheme been carried out, it would have been equivalent to raising the whole surface of the land subject to inundation in that district from 2 feet 6 inches to 3 feet above its present level, thus securing it against flooding." I would wish simply to state that this may be the opinion of the Conservators, and I have no doubt that Mr. Clutterbuck, whom I believe you are going to examine, will back their opinion; but there is another opinion to be set against that of the Conservators, which is a most important one; it was made in the year 1874 by Professor Phillips, who has written a book, which is a standard book on the Thames Valley. He, in his statement, simply says that this scheme of Messrs. Beardmore and Leach might have improved the navigation, but he thought it would do little if anything in protecting the land from floods. These are two distinct statements; therefore I say that the Conservators' statement is simply an assumption. Then, again, there is a remark in the Report of the Conservators about the opposition between the city authorities, the university authorities, and the landowners, whereas all are agreed. You had the evidence of the Dean of Christchurch before you on the last occasion, and I think you have heard from him that he is at one with the landowners, and that there is no dissension in opinion at all between us; on the contrary, we are all agreed together about it. This paragraph No. 6 would suggest, that the Oxford Board of Health or the university authorities were on one side, but unfortunately the riparian landowners were on the other side, which, in point of fact, is not the case. Then again, at paragraph 9, there

*Sir Trevor Lawrence—continued.*

is a disparaging contrast drawn as to the action on the part of the Thames Commissioners, compared with what the Conservators have done. I heard Mr. Hawkins's evidence, and the facts have been most clearly stated by him. The question I heard asked was, Why between the year 1875 and the beginning of the year 1877, there has nothing been done? In the first place we were delayed from the year 1871 to the year 1875 by the Royal Engineers; we could not push the work on as quickly as we could wish. It was an extremely long and tedious work. We had to form our rate upon the report of the engineers, and therefore considerable time was consumed in that matter. As soon as we possibly could, we had a meeting to form our district boards, and we set to work at once. As Mr. Hawkins has informed you, there was a firm of engineers who, of their own accord, volunteered to make a report. I do not know whether the Committee may not misunderstand about that. There were several questions asked Mr. Hawkins as to why there was any delay after this report was made. There was no hesitation about the necessity of works being commenced, the only hesitation was in respect to the adoption of Messrs. Falkiner and Tancred's plans. What was settled at last was that we should go to what we considered the highest authority, namely, Sir John Hawkshaw. We had a meeting with Sir John Hawkshaw at the Enclosure Commissioners' Offices in London, and the first question we asked him was what it would cost to make a report upon the river. There were no available plans in existence of the upper river beyond those made for us by the Royal Engineers. These had cost us 5,000 £. They were very good as far as they went, but they were only intended to give us a basis for a rate. Sir John Hawkshaw informed us that further plans would be necessary for engineering purposes before any work could be done, which would cost us an additional 3,500 £; so that you may well see that we have had very great difficulties to deal with these.

*Mr. Samuelson.*

509. Were you compelled to consult the district boards?—Only as a matter of expediency. We have adopted the representation system in the formation of our commission, on the principle that those who are taxed ought to have something to say to the management of the business. We take into consideration the occupiers as well as owners of land. We have divided our area into seven districts, and each of those districts have power to act, subject to the central authority, whose province it is to prevent any of those districts from hurting each other, that is to say, No. 1 district cannot do anything without applying to the Commissioners for leave to do it, and the same with regard to No. 3, No. 4, No. 5, No. 6, and No. 7, and so on. When we obtained a report we referred it to the district boards to know if there were any local circumstances, which might have escaped the attention of the engineers, and we asked them to report upon it. No. 2 district reported that they thought that dredging was the most important part of the affair; No. 4 district, that of the Windrush, between Witney and Newbridge, was one of the great difficulties, and so on, and that was the reason why we applied to those district boards.

510. Under whose sanction were those works ultimately

*Mr. Samuelson—continued.*

ultimately executed; under the direction of the Commissioners, or under that of the district boards?—All work is done under the authority of the Commissioners; the local boards may be permitted by the Commissioners to do their own work, and they may also have the privilege of paying for their own work, and they are very willing to do it. As Mr. Hawkins has said, No. 4 district has already had leave given to commence work, and they will commence it very soon.

511. Then it is only in the event of the district boards not doing their duty, that the Commissioners would set to work in order to execute improvements?—After they have had leave it is.

512. And in the first instance the district boards may execute works with the concurrence of the Commissioners?—Yes.

513. Supposing that they fail to execute the necessary works, may the Commissioners then intervene and carry out the works for them?—Certainly.

514. That is the prescription of the Act of Parliament?—Yes, certainly.

515. So that you could not have done anything until you had given the district board an opportunity of doing it themselves?—Yes, it is in our option to give them leave or not, only we think it better, as a simple matter of expediency.

*Sir Trevor Lawrence.*

516. How does that bank of which you speak, which continued for six miles, and which you put up for 3,000 £, keep out the lateral floods that have spread over the land above the bank?—Because it is on a curve; you can see on the map how the river winds. If you take, for instance, Eynsham to New Bridge, it goes in a bend altogether.

517. Would that be sufficient to keep floods out?—Yes; if there had not been a bend we should have made a transverse bank.

*Chairman.*

518. In the report from the Conservancy I notice that they have effected considerable improvements between Lechlade and Oxford?—That is their statement.

519. The Conservators have been reproached for neglecting these things, and they state that “this reproach is undeserved, for considerable improvements have been effected between Lechlade and Oxford”; have you any remark to make upon that?—There are no improvements that affect the landowners in any way whatever.

520. You are not aware of any improvements that have been carried out by the Thames Conservators?—I believe you mean in the district between Lechlade and Oxford. They have compulsory powers, enabling them to buy up the old weirs, they buy up the weirs and do nothing to them, and the consequence is that they are choking up the river and making matters much worse.

*Sir Trevor Lawrence.*

521. I think you say you did not have a report from Sir John Hawkshaw?—No; we only asked him what it would cost, and then we waited until we saw what your Committee was going to do before we went any further.

522. Did you get an answer from him?—Yes, I have it here.

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*Sir Trevor Lawrence—continued.*

523. What would be the cost of a report?—I will read a paragraph in Sir John Hawkshaw's letter:—“The cost of supplying a scheme for the arterial drainage of the district between Cricklade and Long Wittenham, together with an estimate of the cost of carrying the scheme into effect, would, as nearly as I can tell, be about 3,000 £.” Such a scheme, Sir John Hawkshaw, as an engineer, tells us is necessary before any engineer can do any work at all.

*Chairman.*

524. What benefits do you expect to arise from the deliberations of this Committee?—We hope for three things. In the first place we wish to impress upon this Committee very strongly that we desire to be allowed to manage our own affairs. That is the first advantage, and we hope, secondly, that we may be able to obtain the loan of money at an easy rate from the Government for doing our work. We are not at all averse to being taxed if it is done fairly, that is to say, for benefit received. We consider, as far as the agricultural question is concerned, that we are the best judges of what the benefit is or is likely to be. According to our present Act, we tax ourselves, that is to say, the general board taxes the local boards, and if they are not satisfied, there is an appeal to the Court of Quarter Sessions. There has been no objection made to this arrangement, and it seems to me, as far as the arrangement goes, to work very well and give entire satisfaction. Then we think, thirdly, that we should be relieved of the cost of the necessary Acts of Parliament.

525. What rate have you in your mind?—That depends entirely upon the length of time which the Government would lend us the money for. If we got it fixed for 50 years, we should get it at a much easier rate, and if we got it at 80 years, we should get it at a much easier rate again.

*Mr. Samuelson.*

526. You would expect to get it at the same rate as a local board?—Yes; if we got it at  $3\frac{1}{2}$  per cent. and  $1\frac{1}{2}$  per cent. for paying off principal that would be 5 per cent. Then we should like the rating powers simplified. It has cost us a great sum of money at present simply to settle the rating.

*Chairman.*

527. Do you consider that the plan that appears to be adopted by your Drainage Commissioners is an equitable and reasonable rating of the land between the river and five feet above the floods?—We do, with this exception, that we should very much like to take in the towns, and get our rates relieved in that way. The rating in that district has cost us 1,728 £. in assessing and collecting the rate alone, including lawyers' charges.

*Sir Trevor Lawrence.*

528. If you were to take in the towns to relieve your rates, would not the towns have a claim upon the country district to relieve the expense of taking their sewage out of the river?—Not that I am aware of. If you remember, it was chiefly the towns that formed that deputation to the Home Secretary a little time ago to ask to be relieved from the floods. It would

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would be only for benefit received that they would pay. It would be a great question to know how to rate them; whether it is for the storage of water, or for the improvement of health, which is a doctor's question after all, or for relieving them from the flooding of their houses; but the recent action the towns have taken, shows they are desirous that something should be done.

Mr. Samuelson.

529. Is there anything to take the Thames Valley out of the general category of the inquiry which is going on now before the House of Lords?—I believe the House of Lords' Committee is only dealing with the general question.

530. Is there anything special in the case of the Thames Valley that should cause it to be dealt with differently from other valleys generally throughout the country?—I think so; it seems to be the general impression, that it is a river which is more important than other rivers, from its position and from its relation to London, that is a matter of opinion, of course.

531. But would not the same general principles apply in the case of other rivers as in the case of the Thames?—I am not sufficiently acquainted with other rivers to answer that.

Mr. Walter.

532. To what extent do the interests of the Thames Conservators and the Thames Valley Drainage Commissioners come into conflict; that is to say, how far do the interests of the navigation interfere with the interests of the drainage?—If they are managed as they ought to be, I do not see that they could interfere with each other at all.

533. Is there any reason why the two functions should not be managed by one body, supposing a body could be constituted for that purpose?—The navigation interest above Oxford is nil, whilst the agricultural interest is immense.

534. Is there any reason why the navigation interest should not be confided to the Drainage Commissioners?—None whatever.

535. Do you consider that the Drainage Commissioners are better able, if they had the power, to look after the interests of the navigation in the upper part of the river than the Conservancy is to look after the interests of the drainage?—Quite so.

Chairman.

536. I would only direct your attention to this fact, that this is a Supplementary Report of the Thames Conservancy, in which they state, "The recent floods in the Valley of the Thames having attracted public attention," and so on, "The Conservators of the River Thames think it right to supplement their annual Reports made to Parliament," with regard to the Thames Valley?—If I may be allowed to call your attention to it under the head of expenditure, there is no way in which we can see what has been spent by the Conservators in dredging, in their report of 1877 which we landowners up the river consider one of the most important points of all.

Mr. Cartwright.

537. You asked for particulars, did you not?—Yes; the Conservators do not think good to furnish us with the particulars when we ask

Mr. Cartwright—continued.

for them. There was a strong expression of opinion at our Board as to the want of courtesey in the answer that we received from the Conservators. I do not wish to go into any personal question, but it was simply for the sake of obtaining information that we asked them. We have had great difficulty in arriving at any distinct understanding of the statements made by the Conservators. I find that the whole of the dredging only came to 3,000 l. in the course of nine years, and that is a very small sum out of the vast sum which the Conservators have spent.

538. Have the Royal Engineers given you any scheme?—They made most accurate and clear maps; it was simply for the sake of getting the rating that we went to them; we could not get a basis for our rating without having an exact map of the country.

Mr. William Cartwright.

539. When you referred to the report and plans of Messrs. Falkiner and Tancred, of that district, the question of rating was never submitted to them?—Not at all; we never asked them anything; it was a volunteer statement on their part. We were much indebted to them for the great gratuitous assistance they afforded us.

Chairman.

540. I would ask you the same question as I have asked other witnesses, whether you are of opinion that if the scheme were carried out by one authority to have jurisdiction over the whole of the river and its tributaries, in which the landed proprietors on the banks of the river and the local authorities should be fairly represented, such a body would work satisfactorily to the upper part of the Thames?—I am quite certain of this, that if that body was sitting up in London, it would not for one moment give satisfaction, simply because busy men and those best qualified to undertake the management, and to understand the requirements and feelings of the district could not attend. I myself was one of the conservators for a year. I was one of those elected in the first year, 1866. When any question comes on, you go up to London, and find, perhaps, that it is all lower river business. It might be all very well for me or for Mr. Clutterbuck, or anybody who has time, but for a number of persons who are mostly farmers, who are the people that we get for commissioners, you must have places where they can meet, and where they can attend. My opinion is that seeing what satisfaction our Board gives, so far as its constitution is concerned, if there were two such bodies dividing the upper river, one such as the one we have now from Cricklade to Long Wittenham, taking in 40 miles of river, and another from Long Wittenham to Staines, taking in the other part of the river, each representing the local interests, and being used for the purpose of rating for their own works, it would be by far the better plan. I think that the two boards I propose should be placed under the supervision either of the Board of Trade or the Inclosure Commissioners in the same way that we are now placed under the Inclosure Commissioners (for we cannot do anything now without reference to the Inclosure Commissioners). Our position with reference to the Conservators is at present very cumbersome; before

*Chairman*—continued.

before we can do anything, we are obliged to go to the Conservators, and ask them (in matters relating to arterial drainage) if they are willing to carry out such works as we may propose. The Conservators may then say, No, we will not do this; we have then the power to refer to the Board of Trade; and if the Board of Trade thinks that it is reasonable, and says, Yes, you may do it, we may do it without further reference to the Conservators.

541. You say that one authority would answer; do you wish to see two authorities established, or three?—I meant one controlling authority, and two executive authorities working under it.

542. Taking Teddington as the point of demarcation between the tidal river and the non-tidal river; as regards the management of your upper river from Teddington, what authority should you like to see controlling it in every respect as regards the drainage and the navigation, and keeping out pollution?—I should say that nothing could give more satisfaction than two Boards constituted like our present Board to carry out those three objects; having a controlling authority, such as the Board of Trade or the Inclosure Commissioners to keep them in harmony.

543. You mean that the Thames Valley Drainage Commissioners should have the whole control of the river as regards those three objects?—Yes.

544. Leaving to the Thames Conservancy the management of the river below?—Yes, of the tidal part of the river.

545. Both bodies to be controlled by the Office of Works?—Or the Board of Trade, or the Inclosure Commissioners, it does not matter which.

*Sir Charles Russell.*

546. Do you propose that your own Drainage Commission should be enlarged so as to extend down to Teddington?—I do not; I propose that there should be another Commission below Long Wittenham, in the same lines as our own, to reach down to the tidal river.

*Chairman.*

547. Then that would be a third. I asked you whether there should be two authorities or three, and you are now for creating a third authority?—Then, I am sorry to say, I misunderstood you.

548. Will you kindly state what authorities you wish to have jurisdiction over the whole of the river above Teddington and its tributaries, to carry out the objects which you have stated?—Two authorities above the tidal river.

549. And those two authorities should have equal powers over each respective part of the river?—Precisely the same powers; the third authority to which I referred was simply a controlling authority.

550. Then the first one would be from Teddington, upwards, to Long Wittenham?—Yes; I must be understood to give this opinion simply as expressing the satisfaction that it would give to those who are governed.

*Mr. William Cartwright.*

551. I suppose it is the practical upshot of your evidence rather to give amongst the riparian owners the management of the upper river?—That is the fact.

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*Mr. Samuelson.*

552. Some small works have been carried on already, have they not, under your authority?—We have given authority to two district boards to carry out works which, we think, very desirable to be carried out.

553. Will those works affect the navigation?—Not at all; they are in the tributaries of the Thames, where there is no navigation.

*Sir Trevor Lawrence.*

554. So far as your own opinion goes, the riparian owners would be perfectly satisfied that the power which is now exercised by the Conservancy should be placed in the hands of the Thames Valley Drainage Commissioners?—Quite so.

*Mr. Watney.*

555. What is done with the drainage within the first point from Cricklade to Long Wittenham?—Oxford is the only town that I have any experience of, and that, as we know, has cost a great deal of money, and is not yet finished. They are going to put their sewage farm at Little more; it has cost, I believe, upwards of £100,000.

556. But in all the rest of the places on the Thames, what becomes of the drainage?—They are not allowed to drain into the Thames, but what they do with it I do not know.

557. Do they send it into the Thames, do you think?—I suppose they do.

558. With regard to the quality of the water, is that affected at all by the drainage?—I had the water analysed from exactly opposite my house, which is half-way between Abingdon and Oxford; it was analysed by an officer of the Royal Agricultural Society, and he reported it as totally unfit for use. Then I have Sandford mill just above me, so that that may affect it very much.

559. The board that you suggest would very likely be very good for the navigation of the Thames, but you think it is a board that would be likely to take up the drainage question?—It is entirely the drainage that it is concerned in.

560. At present you say that they ought, but that, practically, they do not keep the sewage out?—I am talking of the country, not of the towns; we have nothing to do with the towns.

561. You think it is the towns that pollute the river?—Chiefly.

*Sir Trevor Lawrence.*

562. Was the chemist's opinion on the water given after the water had undergone efficient filtration, or just as it was taken from the river?—Just as it was taken from the river.

563. Then London is supplied with a water which will bear that character?—This was simply a local circumstance; it was only to guard myself that I had it done.

*Mr. William Cartwright.*

564. Have your board had any communication with the Conservancy Board; have you tried to consult with them about any works?—No, we have had no occasion yet, but we could not interfere with the arterial drainage without going to the Conservators; the drainage which we have at present given leave to our district boards to undertake is not arterial drainage; it concerns the River Windrush and other tributaries of the

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the Thames, where the Conservators have no authority.

Sir Trevor Lawrence.

565. Are there any towns draining into your affluent?—Yes, Witney does; it is a manufacturing town too, which makes it very bad.

Chairman.

566. Have you a list of the districts, and the number of places which are represented?—Yes, I have, and also a list of the members who constitute the Commissioners (*delivering in the same*). I have also the names of the chairmen of the different district boards (*delivering in the same*). All owners of 50 acres of land, and occupiers of 30 acres, have a vote in the election of the Commissioners, so that it is the most fully representative board that you could wish for.

Mr. W. H. Gladstone.

566. When you were on the Board of Conservators, did you attend the meetings regularly?—As far as it was in my power, living at a distance of 60 miles. The financial arrangement under the head of attendance is a curious one.

Mr. W. H. Gladstone—continued.

Mr. Hawkins has told you what a large sum is allotted for the Conservators' fees. There are several meetings in the week; a guinea is supposed to be the fee for attendance, but in practice the guineas of those who do not attend are given to those who are there, so that 22 guineas may be divided each day between five persons. This gives a great pecuniary advantage to those Conservators who live in London.

568. The whole of them?—Not the whole of them, certainly.

569. You found that the greater part of the business related to the tidal part of the river?—It so happened when I was there that it did.

Sir Trevor Lawrence.

570. I suppose those who attend would, as a rule, be gentlemen from London?—Of course they have greater opportunities of attending than those at a distance. That is the reason why, if the Board to regulate the upper river were to sit in London, I do not think we could have an adequate representation of persons who know enough about the subject and who could give up their time and their business to go so far as London to attend the meetings.

#### THE REV. JAMES CHARLES CLUTTERBUCK, Examined.

Chairman.

Rev. J. C.  
Clutterbuck.

571. I THINK you reside at Long Wittenham?—Yes.

572. You are the Incumbent of Long Wittenham, are you not?—Yes, I am.

573. I believe you are also a Thames Conservator?—Yes, I am.

574. You necessarily have paid considerable attention to the floods in the Thames Valley?—Yes, I have. If the Committee want a map, I have got a very good map here, showing more details than that on the wall. I think it shows the river fully, and if the Committee wish it, I think I have one which is geologically coloured, showing the different geological conditions of the surface, by which you might judge perhaps what the difference was of the absorbing surface of the district, and that which would throw the water from its surface.

575. From your knowledge, what works have the Thames Conservancy carried out between Lechlade and Oxford?—Between Lechlade and Oxford, they have first of all thoroughly repaired all the locks, pound locks as they are called, beginning with Medley Weir (I believe that is done now), Godstow Lock, King's Weir, which is rather an extraordinary construction, but which it was necessary to restore, Pinkhill Lock, Rushey Lock, Buscot Lock, and St. John's Lock. I believe those are all. When first I visited that part of the world, which was before the Act, which brought me into the Thames Conservancy, almost all of those locks, indeed, I may say all of them, were in a most frightful state of dilapidation. Rushey Lock had, I think, only two gates out of four, and it was stuffed up with hurdles, and straw, and that sort of thing, to keep the water up to a certain height, and at St. John's Lock in the same way. I made sketches of them; they are very picturesque indeed, all broken to

Chairman—continued.

pieces; in fact, it would have been impossible to have carried on the navigation in the state of those locks. Since that, all those locks have been put into an efficient state; and as regards the locks, the navigation may be carried on up to Lechlade, although the river is in a very miserable condition still. Almost all the old weirs which were in a most extraordinary dilapidated state were removed, where the river was what is called throttled; but notwithstanding these weirs are not all gone yet, they are more or less taken away, and the pound locks were put in a state of efficient repair.

576. As regards dredging of the river, has the Thames Conservancy carried out much work?—A considerable amount of dredging has been done from time to time in the upper river but not very much.

577. Is much required?—A great deal is required.

578. Why has not that dredging been carried out?—Because there is not money enough in the funds of the Thames Conservancy to carry it out; that has been the only reason.

579. It is a case of poverty then?—It is a case of poverty absolutely; poverty and not the will consents.

580. Do you attend the meetings of the Conservancy generally?—Yes, almost always.

581. Have you attended the meeting of to-day?—Yes, I attended it to-day and was obliged to come away at your call.

582. Do you feel that the Conservators of the Thames are doing their utmost to keep the river in a satisfactory state, so far as their funds will admit?—Most decidedly, particularly if you go by their reports, for I believe almost all the locks are in good condition, some have been new and some have been repaired under the superintendence of

*Chairman*—continued.

of Mr. Leach, and they now present a very respectable appearance indeed, and some of them are structures which do very great credit to the engineer.

583. You have heard the evidence of the two last witnesses, and have you any comments to make thereupon?—Yes, I am afraid I shall make rather too many. I think it is necessary to say something with reference to the action of the Thames Conservancy, with reference to the scheme which they proposed of relieving Oxford of floods as much as might be. The Conservancy were very much pressed from various quarters to do what they could, with reference to the condition of Oxford. The condition of Oxford was considered to be exceedingly unsatisfactory with reference to the floods. There were a number of streams here and there (but, however, it is not necessary to go into that) in a very bad condition. I believe it was in consequence of a saying of the late Dr. Buckland, the great geologist, who said "Give me the power to do as I like with Sandford, and I could drown Oxford." Now I have always traced the feeling that Sandford weir, lock, and mill, was the cause of great mischief in that district to that saying of Dr. Buckland. It is always to be remembered that it was with our own staff that we executed the survey, through Mr. Leach and Mr. Beardmore. I need not speak of Mr. Leach, because I could not speak too highly of him certainly as an engineer; and, so far as I have been able to judge of Mr. Beardmore, who was a very well known engineer, the first man I believe in his day in those works which had to do with navigation, the Conservancy were very much pressed and they gave Mr. Leach the assistance of Mr. Beardmore in order to strengthen his hands, and they gave them instructions to make a survey with reference specially to the relief of Oxford. Now I have got a plan here in my hand; I need not trouble the Committee with it, but I may say in general terms that they found that, instead of the great mischief being at Sandford, the great mischief in fact was above Sandford, between Sandford and Oxford. There was first of all the Iffley Lock.

584. On what stream is that; is it the Windrush?—No, the River Thames; they call it the Isis, but I call it the Thames, the main river. In that place, from which the boat starts, there is a lock, with two mills, with their accompanying weirs, and if they were to be swept away, that would be a great step, as it were, which would be removed. I am explaining it as well as I can; but Mr. Leach would have explained to you perhaps better than I can. But, however, that was the great principle upon which this drainage was to be effected, and there was a very great amount of dredging; the river was to be dredged thoroughly, and that line or step, as I have called it, and the locks and weirs were to be removed, and then it was stated positively, and I believe it is perfectly true, that that would have relieved Oxford in a very remarkable manner. Well, the report which was made by Messrs. Leach and Beardmore was published, and with it a certain number of maps were also published, or rather they were sent with the report to all the heads of colleges and the principal landowners in the district, of course, having reference to their approval or rejection.

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*Chairman*—continued.

The University of Oxford, in their hebdomadal Council, as represented especially by the Vice Chancellor, Vice Chancellor Dr. Leighton, approved of it. I have seen a letter of the Vice Chancellor, and that letter is still in the archives of the University, in which they approved of the plan, the plan being, amongst other things, that the money by which these things were to be done was to be raised partly by the conservancy and partly by subscriptions, because the Conservators thought that Oxford, being a rich place as regards its colleges, and being very much interested indeed with reference to the subject of drainage, would join, and that very readily, in the scheme which they approved of. The University approved of the scheme in high, and I might say almost glowing terms, but they said they thought it was impossible that the money could be raised by subscription, and they suggested a rate; the same thing was done by the Local Board, with which I believe Mr. Hawkins had something to do; they approved of the scheme, and they also suggested a rate. Now I mention this, because when it was stated in the Report which was, I think, in February last, made by the Conservators of their doings, the statement with reference to the suggestion of a rate was called in question, and therefore I think it well that it should be understood that that was so. When the Conservancy, in consequence of this proposal, brought in a Bill, they took powers to rate that land which was benefited up to the benefit which that land would enjoy. I am sorry to say that a friend of mine wrote to me from near Farringdon, and said, "I do not know if you are aware what the people are about here, but the man who is carrying about the petition against your scheme is stating that all the land is to be rated at 2*l.* per acre," whereas the 2*l.* per acre was the maximum at which any land could be rated, and all the land was to be rated in proportion to the benefits which it received. That is just as far as I can remember, as to the first doings of the Thames Conservancy as compared with the landowners. The landowners took it up as of course they had a right to take it up, and if they wished to put a spoke in our wheel that could not have been prevented; they asserted that we were not at all likely to be able to carry it, and the Conservancy did not care to enter further into the contest. Then a letter was written to the Board of Trade by the Conservancy, which was presented to the House of Commons on the motion of then Mr., now Sir Charles, Reed, who is the head of the School Board; his name is on the back of that document which I have no doubt the Committee have amongst their papers, and if not, it is a paper which you ought to have, certainly. I have got some copies of it; it may be difficult to obtain as it is out of print.

585. It appears that the Drainage Commissioners and the Thames Conservancy do not harmonise very well?—They parted company on the subject of rating.

586. The system adopted is, that all land excluding houses which are not rated, but all land rated from the river to five feet above the reach of floods shall be rated; is that an equitable arrangement, in your opinion?—I cannot say that I think it is, because in my case we were told first of all that we were to pay about one shilling an acre for a survey, and by some means or other that

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that came up either to 3s. 9d. or 3s. 10d. an acre, and I had to pay 20l. for 100 acres of land which I have, and I cannot have 20 pence worth of good from it, under any circumstances.

587. What plan of rating would you suggest in contradistinction from that adopted by the Drainage Commissioners?—I would rather not suggest any plan.

588. You are not prepared with any plan?—I cannot see my way to it, because, unless you rate the whole district, houses and all, you would not get money enough, unless you make the rate excessive.

589. In order to construct certain works an outlay will be incurred, which it will be necessary to meet, if possible, by rating; are you prepared to say on what principle that rating should be assessed?—No, I cannot see my way through that difficulty.

590. You cannot show any improvement upon the system adopted by the Drainage Commissioners?—No, I cannot; I think it would be impossible; I do not know how you could improve things that are so bad.

591. You could not make them worse?—No, it is impossible, I think. I think you cannot make people worse that have done nothing except make you pay.

592. I presume there is no chance of the Drainage Commissioners and the Thames Conservancy being on much better terms than they are at present?—I think there might be. I do not think the Thames Conservancy are at all inclined to oppose themselves in any factious spirit whatever; I do not think that is in the least to be supposed. I think the Thames Conservancy would like to act in harmony with the other body, but I do not see how they are to do so. The Thames Conservancy have the river to look to, and if they had been allowed to deal with the river, they would have made that which is essential to all good drainage, namely, an efficient outfall; it is because they cannot do anything without they come and dredge the river first. The Conservancy would have begun by dredging the river; it would have been a most wonderful experiment. We had the testimony of gentlemen in its favour, and we had the testimony of those people at first who were most interested; but they turned round directly the rate was proposed, although they themselves had suggested it; and they would not be rated at all. That is a strange thing. They wanted to have all the benefit without paying.

593. For the object of keeping up the navigation of the river, for excluding pollution, and for preventing floods, have you considered what would be the best authority to carry out those arrangements; would you have one, two, or three authorities?—I would let the Conservancy remain as it is, because if you were to discharge the Conservancy at the present time, you would bring about a state of things that you could not possibly remedy. You would have "Confusion worse confounded." The Conservancy have strained every nerve, they have done everything in their power, and they have succeeded in making the navigation efficient up to Oxford. They have been pressed by people in Gloucestershire, and they would be very willing to do all they could to improve the upper river if they had the money at their disposal; but I can assure you,

*Chairman*—continued.

and I know, if you will ask Mr. Leach and also our deputy-chairman, whose diligence in these matters (both of them) cannot be exceeded, who do all they possibly can to understand this great question and to do everything with justice, they will tell you the same thing, and say that all they want is money.

594. But I think you have stated that the Thames Conservancy is suffering from want of funds?—Certainly.

595. And if the additional duty is put upon it of preventing the floods, still further money must be laid out, and therefore some change in the constitution of the Thames Conservancy would be needful unless a new authority were created?—I, of course, should speak with due deference with regard to that matter, because I am one of the body, and I was returned, although my re-election was opposed by those persons who I presume represent the Thames Valley drainage; yet, still I should feel a little hesitation in speaking of the constitution of the board. But I think that some of our members, certainly the deputy-chairman, Sir Frederick Nicholson, know a great deal more than almost anybody does about the Thames, except Mr. Leach. Mr. Leach knows every inch of the river.

596. I am speaking rather of the reconstitution than of the formation of a new authority?—As long as you have such an efficient engineer as Mr. Leach you had much better do the whole by one engineer; and if you have one engineer, I think it is much better to have one board. Honestly I do not think that you could improve the working of the board by the infusion of what is called new blood. I know people think we ought to have riparians, but one of the riparians that we had turned his back upon us and left us.

597. You consider that the Thames Conservancy with a perfect chairman and a perfect engineer requires no change whatever?—I do not think it does; I cannot see that it does; I attend every Monday in the year nearly. I find that the business is done, and nothing can be better done, I think, than the office business. If there is anything goes wrong in the way of the breaking of a weir, or this, that and the other, Mr. Leach telegraphs to the person he has in the upper district, tells him to set it right, and it is done very likely before the next board day.

598. You are not prepared to allow that there has been any negligence whatever on the part of the Thames Conservancy in keeping up the repairs of the locks and weirs?—Quite the contrary. I cannot conceive how any persons could have done more. All they want is money to do it with.

599. Have you adopted any telegraphic communication between the different parts of the river, so that you may be aware when there are floods in one part, and the water low in another?—I do not think that at all necessary, and I will tell you the reason why I should not advocate such a thing. I do not think it is necessary, for this reason: Between Oxford and London there are a great many mills; all those mills have weirs to them, and there is no doubt whatever that the great difficulty is in the mills. You cannot lower the water at the mills below a certain point, they must have a certain head. When there is a flood coming it is all very well to say, "Oh, empty the river," but you cannot do it without a breach of the

Chairman—continued.

the Act of Parliament, because you would injure the millers. The millers object is to keep the head up and the tail water down. And it would be a mere matter of impossibility, in the present state of things, that there should be anything of that sort, just the same as it would be impossible to do anything very great in the way of storage of the water except in the river itself.

Mr. Walter.

600. You consider that those mills are one cause of the floods?—I do not say that they are the cause of the floods, because we know that it is the quantity of water that falls that causes the floods. But still, at the same time, they hinder the getting away of the floods.

601. Have they any object in flood-time in keeping the head water above a certain height?—Mr. Leach would tell you more about that than I can, but according to what I believe a miller is bound not to allow it to rise above high water mark. Of course there is a great temptation to do so in order to have more power to the mill, but it is also absolutely necessary to lower the tail water in order that the machinery may work. And therefore if there was to be an order issued to empty the river, supposing there is a quantity of rain falling in the upper part of the Thames, you might do it very easily by telegraphing, and having a person to come and throw open the gates and so on. Of course the millers would at once object; they would say that they had no idea of your sending all the water away, like so much money flowing down the river.

602. You would be afraid of being flooded; but if the system were commenced at the bottom, at the proper place, say at Teddington, and opened the weirs and all the works up the river in the same way, if you took it in time, is there any very great objection to that?—I do not think that could do much good. If you had the mills right away and made the river nothing but a carrier of the flood waters, it would be a different thing; but you have the mills and you cannot help yourself. I have some diagrams here of the relative height of the floods (*delivering in the same*).

603. Can you tell the Committee when the system of lockage on the Thames began?—No, I cannot, except that I think it is not a very long time since the pound locks were introduced. They were flash locks. The boats were winched up. There are some old winches remaining even now or the wrecks of them. They drew the sluices; and there was a sort of beam which they opened like a turnpike, and when the water was nearly level they pulled the boats through by main force. That was done away with, I think, about the time that the Brindley pound locks were introduced, but I am not quite sure; at any rate, it is not a very old affair.

604. Have you any records to show whether the floods in the Thames Valley have been worse or not so bad since the system of lockage began in the river?—From the records of floods, and the height of the floods, that I have got at different times from different persons, I do not think there has been much difference from time immemorial in the floods. They seem to have risen about the same height. There was a great flood in 1774, which seemed to have been raised by the snow falling. The worst floods were when

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Mr. Walter—continued.

there was snow melting. The 1809 flood, which did an immense deal of damage, swept away the bridges and all sorts of things; that flood was caused by a sudden melting of the snow. There were also four or five floods till 1852. I suppose the Thames Valley Drainage Commissioners have kept a record; but I recollect taking the highest flood, which was about 8 feet. I took guagings from a lock, and I have taken it for many years, and I find that it was about 8 feet last year above navigation high water mark; there was a great and most remarkable identity between the floods of 1852 and the floods this year. There were about 90 days previously to the flood coming to its height in both instances. In 1852, I have not got every day's rise and fall of the flood, as I have for last year, but taking the culminating point, the flood this year rose to exactly the same point as it did in 1852; and I find that there was about 12 inches of rain in each case (I have a rain guage) which caused that flood, falling under the same sort of circumstances; because floods are caused as much by the conditions under which the rain falls, as by the absolute amount registered. First of all, before there is a flood, there must be a super-saturation of the soil. It takes between three and four inches of rain, or perhaps not quite so much as that, to super-saturate the soil. If you have rain falling at intervals it will take more time, but if you have a large quantity falling in a shorter time, then the flood will rise quicker. If you would care to look at this, I think it is perhaps worth your notice, for it will show you the two floods (*delivering in a diagram*). The lines on it show the rise and fall of the water, and the lower part shows the rainfall. The largest rainfall is about an inch. In 1875 there was a higher flood by about six inches, and a very different condition of rainfall, the rainfall coming in a very short period of time. You will see how immediately the flood rises with a very large rainfall, the rainfall being described by the blue lines on the diagram. As far as I can tell (and I have lived on the banks for 46 years, therefore I have some experience in the matter), I do not think there is much difference in the floods during the time I have known the river. It is said that the floods come quicker, but I very much doubt whether they do come much quicker. If they do, I think it is because a great many of the weirs which blocked back the water in the upper region are taken away, but I do not know that there is anything in any way different from what it used to be formerly; and there is another point which is this: a great deal has been said about the land drainage; I believe that the land drainage would rather decrease the floods. People think differently very often, but I think so for this reason, that during a whole year there is a considerable amount of evaporation. In the coldest weather in winter there is a great deal of evaporation. There is evaporation from the surface of snow and ice. The amount of evaporation depends more upon the condition of the atmosphere than upon the heat of the atmosphere, whether the atmosphere is in a condition to take up moisture. Before any water can flow from the drained soil, the surface must be thoroughly saturated, and the subsoil must be thoroughly saturated. I believe that there is a replacing of the

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the moisture on the surface. I have tried experiments which lead me to believe it is so in surface-drained soil, and also in undrained soil. I found, the other day, that some men of considerable eminence as engineers took the same view of it which I have arrived at independently. Therefore, I do not think that there is any danger of the floods being increased by the land drainage; but I do think this, that there might be great easement given to the floods by better engineering of the river, which could be done, and most decidedly would be done by the Thames Conservancy, if they had the money to do it with.

605. Has it ever occurred to you whether such relief might be given by making channels across the bends of the river, say between those points on the map, Abingdon and Ridges Weir?—Yes, there has been a general idea that, just above the word "Abingdon" on the map relief might be given; but I should be rather sorry to see it done.

606. On what ground would you object to it?—If it is only used for relief for the floods I should not object to it at all. There is a great deal indeed that wants doing in the way of straightening the river and so on, but it would be an expensive process. If the Thames Conservancy had the money they would do a great deal with regard to navigation. Then there is the great question of the storage of water for London, which is a most important question. I think it is not generally known that most of the perennial water of the Thames comes from the chalk, the back drainage of the chalk, if I may so express it; because you know that the Vale of the White Horse is flanked by chalk hills, and out of the chalk hills a considerable quantity of water flows. If you look at the geological map which I have here, there is a red line which shews the watershed of the Thames. All that is coloured is the clays, and all that is not coloured is the oolites, and chalk and all those strata, through which the water can percolate; and you also observe the lias clay. The chalk delivers its water very steadily. The oolite delivers it unsteadily; and there are places on the Churn, for instance, where the whole river descends into the earth. There is less water reaches the Thames than issues from the seven springs near Cheltenham sometimes, at low water time. I have studied the question of water a good deal with reference to the storage of water. There are valleys in the upper district where the bottom is the lower lias clay; between that and the surface there is a stratum called the marlstone, which is iron-stone. It is pervious to water; a great deal of water comes out of it, and that is the water that is stored in what is called the Boddington Reservoir of the Oxford Canal, which is never quite short of water. I do not think that in the valley of the Thames you could ever make any efficient storage without an immense outlay; you could perhaps do so if it was necessary, but I do not see the necessity of it; there is plenty of water in the Thames for London. The quantity of water which passes Oxford has been reduced in very low times to something like between 50 and 60 million gallons a day; it never has been known that a less quantity than 350 million gallons passed over Teddington Weir, which receives the whole of the drainage. It is

Mr. Walter—continued.

a mistake to suppose that most of the water comes out of the upper district. So far from that, the Kennet and the Coln, and all those streams, bring the perennial water into the Thames; besides a great deal is added where the chalk is cut by the Thames, and the water finds its way into the bed of the river.

607. Do you attribute any mischief to the increase in the weeds of late years?—No, I do not think there has been an increase of weeds; I think rather the contrary; that weed which used to be called the American Weed seemed to find a habitat in the Thames at one time, but I think it has almost disappeared. I do not think there is any mischief from weeds. I am quite sure of this, that the only supply that London will ever have will be a supply from the River Thames. It is a great mistake to suppose you will ever be able, if I may say so, to supplant the river.

Mr. Watney.

608. I understood you to say that the mills prevent the river being let off where otherwise it would be advisable to do so?—Yes, that is my conviction.

609. Have you any idea how many mills there are that prevent the river going down in this way?—I cannot tell off-hand, but there are a great number of mills. In almost every case where there is a lock and weir there is a mill; sometimes there are two mills using the same head. I think that is the case near Maidenhead.

610. May I take it that probably there are one or two mills at every lock?—No, there cannot be so many as that. Just at the moment I do not know of any mill without a lock; until you get above Maidenhead that is not the case.

611. What control do the Conservators have over the lowering of water at the locks?—The order to all lockmen is that they shall never allow it to go below low-water mark or above high-water mark, but to keep to that point.

612. How do the Conservators see that that order is carried out?—They are obliged to see that it is carried out as well as they can by trusting to the lockmen.

613. Do they see that it is carried out at all?—I believe so.

614. Is anyone sent round to see it?—It is the duty of the superintendent who goes round to see to these things, and if he does not see to it, he does not do his duty.

615. Is it your opinion that anything might be done to stop the floods by altering the level when there is a heavy rain in the upper valley? No, I do not see how that is to be done. I live near two locks, and we have no mills at them.

616. Never mind the mills now, but the question I ask is this, would you not think it advisable when rain has fallen heavily, to give orders to have the head water lowered?—Decidedly, what we should call ease the flood.

617. Is that done?—I do not know that it is done, because it is so difficult for a man to judge what water would be sure to come down.

618. I suppose that your man has no discretion; he has given him certain rules, but does the Board issue any orders under such circumstances?—I cannot tell you exactly what the orders are, but there are orders that the water should

Mr. Watney—continued.

should be properly regulated, and it would be a breach of duty in the man not to carry these orders out.

619. But is there an order to keep the water at certain level?—Yes; records are kept of the height of the water at the locks twice daily.

620. Does the Board take any steps in winter when a flood is coming to alter the level?—No, I think not.

621. Do not you think it would be advisable that they should do so?—I think it might be, but I do not think you would get much by it.

622. If you let the water off, beginning at the bottom locks, surely that would diminish the flood?—In certain circumstances, such as the sudden melting of snow, I think that might be done, because you are sure that there would be a great quantity of water, but you cannot judge of the effect that would be produced by rain without you have a great number of rain-gauges.

623. Then the fear running in your mind is that, supposing you let it off too low, there would not be sufficient water to fill the river?—In winter time there would be, and sometimes there is a summer flood, and they are more disastrous than anything. I think in a summer flood, which occurs once in 20 years, in a July flood, perhaps, you might do something of that sort, but I think it would be very difficult to lay down any rules because you have to deal with rather ignorant people.

624. What I suggested was that the order should come from the head Conservancy by telegraph up to those men, "Reduce your head water four inches or five inches," as the case might be?—I think that if you were to ask Mr. Leech that question, he would tell you that we must be satisfied with those general orders to the men and see that they are carried out.

625. Nothing else is given to the men but those general orders?—No.

Mr. Samuelson.

626. I understand that you are of opinion that it is satisfactory that the jurisdiction of the Conservancy should continue to extend to Cricklade?—I think so decidedly. I have never had any other view. I do not think you could do it better because the Conservancy have the command of the river. If you take the river and put it under another Conservancy, that would be another question, but I do not think there ought to be any divided power with reference to the river.

627. But there is now a divided power, is there not?—To a certain extent there is, but nobody can touch the river at present without the consent of the Conservancy. They may force it, perhaps, but *prima facie*, that power is in the hands of the Conservancy.

628. You think that the present state of things is desirable in which the drainage is under the management of one board and the navigation under another?—I think so.

629. Although the state of the river in respect of navigation affects the question of drainage?—Yes, I think so. You either must have navigation or have none at all. If you have none at all, you may yield the river up to the Land Drainage Commissioners, who are interested in the land

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Mr. Samuelson—continued.

drainage, but so long as you have navigation you cannot do that.

630. Which do you consider the more important question now; the question of drainage or the question of navigation?—I think, as an agriculturist, I should say the drainage question, but I doubt very much if you could do away with the navigation.

631. Is there anything which should prevent the navigation being placed under the jurisdiction of the Drainage Commissioners?—It might be; they might have greater power than they have now. I do not know that there would be much mischief in that, but of course if they had the power they would also have to spend money. Whoever has power over the river must spend money in keeping it in order.

632. I suppose the possibility of executing works would, to a great degree, depend upon what money they have to spend?—Yes, that is the whole case, I think.

633. The taxing power of the Conservancy is limited, whereas the taxing power of the Commissioners is unlimited?—Quite so. The Conservancy have no taxing power at all.

634. They have only the power of levying toll?—They levy a toll for navigation; they have no power of taxing the land at all.

635. The state of things is this, that those who have the power of the purse have not the power of executing works?—Just so.

636. Whereas those who have the power of executing works have no money to execute them with?—Yes, that is so.

637. Do you think that a satisfactory state of things?—I do not think it is at all. I think it is unsatisfactory, but the state of things consists in this, that you have people who are charged with a certain duty, and you do not give them power to do it.

638. And there are other people who have the means of performing that duty, but who have not the power to do it?—As they have not the power to do it, the only question is whether the power would be best in their hands.

Sir Charles Russell.

639. I am going to put a suppositious question which I think you will be able to answer from long experience. Supposing the control of the river from Teddington to Cricklade to be given over to one body with reasonable sufficient powers of money and other control, and supposing it was known to that body that very heavy rains had fallen on the upper district of the Thames, and they had the power of communicating with every lock-keeper, and with every mill-owner, and they gave them an order by telegraph, "A flood is expected let down the water," and that was done from Teddington, right up the river, do you think that that would materially diminish the height of the flood?—No, I do not think it would materially diminish the height of the flood, because the capacity of the river, as compared with the floods is very small; I have gauged the floods and I have gauged the river, and I know the difference.

640. Then I presume that any expenditure in dredging would practically have very little effect upon the floods, because if the opening of all the weirs and all the lock-gates before the flood has commenced to rise, which must give an immense lowering to the river would not have much effect, surely

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surely dredging a certain number of mud islands could not be very effectual in that direction?—It would be a great easement to the river, I think, if it were properly dredged; for instance, in some places you see there are islands on the river where there ought to be none; but they are allowed to grow up, and that must retard the floods. I do not think you could do any great work in any way that you can conceive, that would make any difference in the floods.

641. I live on a river myself that is very liable to floods; a mill below me was burned down, and I am happy to say that the owner has not restored it, and the difference to my floods is so enormous that I do not think that anybody who had been bred and born there, as I was, could believe the difference that has taken place by doing away with one mill?—I can understand that perfectly. You see in every hill there is a great extent of dammed-back-water, and as I have said the millers are protected by Act of Parliament; and their interest is to keep the head water up and the tail water down, and therefore as long as that physical difficulty exists, so long you will have difficulty with regard to lowering the floods. If you had a clear sweep all the way down the river and swept away all the mills, no doubt there would be a great difference, but of course that cannot be done.

Mr. Praed.

642. Who sees that the millers keep the waters up to the proper height?—The lock-keeper who has charge ought to do so.

Mr. Praed—continued.

643. But does he do it?—He ought to do it, and therefore we presume that he does do it.

644. Is the lock-keeper one of your servants?—Yes, the lock-keeper is our servant.

645. Have you the means of ascertaining whether he does his duty or not?—Only by means of having people complain when they are injured by it. I know a case where there are perpetual complaints made, and it is a very difficult to keep up the balance between the millers and the Conservancy.

Mr. William Henry Gladstone.

646. Are you a sufferer yourself from the floods?—No, I do not suffer myself personally. I have one meadow that is flooded when there is a long rain. The floods hang about them and spoil the grass. A July flood does a great deal of mischief; perhaps a June flood would do more, because when a July flood comes, we have generally got our hay away.

647. But that is a rare occurrence?—Yes.

Mr. Praed.

648. Does the superintendent make any report to the Conservators if the floods are kept back by the millers at all?—His duty would be, I think, first to remonstrate with the miller.

649. Do the Conservators receive any report from their superintendent that the millers keep back the water too much?—If he desired them to do it, and they were not to do it, he certainly would report and does report.

650. But does he?—He would not do his duty if he did not.

Friday 8th June 1877.

## MEMBERS PRESENT:

Colonel Carington.  
Mr. William Cartwright.  
Mr. Coope.  
Mr. William Henry Gladstone.  
Mr. Hall.

Sir Trevor Lawrence.  
Mr. Richardson-Gardiner.  
Sir Charles Russell.  
Mr. Walter.

OCTAVIUS EDWARD COOPE, Esq., IN THE CHAIR.

Mr. CHARLES NEATE, called in; and Examined.

*Chairman.*

651. You are a Fellow of Oriel College, Oxford?—Yes.

652. And formerly were Member for the city of Oxford?—Yes.

653. You are well acquainted, are you not, with the river below and above Oxford?—Yes; perhaps I may say what opportunities I have had. In the first place, I was a member of the old Navigation Commission before the present Conservancy Board was established, and being a Member of Parliament, I was a member of the Committee which transferred the Thames from the old Navigation Commissioners to the present Conservancy: I was an original member, although I am no longer so, of the Thames Valley Drainage Commission fund, named as a Commissioner in the Act. For many years I have been concerned with the drainage of the district in the neighbourhood of Farringdon, including the drainage and inclosure of the property of the college. Ever since that has been done I have attended the meetings, and I have usually been the chairman of the district board. Those are the opportunities that I have had of becoming acquainted with the Thames.

654. Are you one of the present Thames Drainage Commissioners?—No, I vacated to make room, and at my own request, for the present treasurer of the college, thinking that it was an office which had better be connected with the possession of property, and as he represented more than I did of the property of the college, he was a better person to be a member of the commission.

655. Whilst a member of the Drainage Commission, did you carry out any works in fulfilment of the Act?—No; we laid a foundation, and we did a great deal of work. There was a great deal of zealous work, and a great deal of good work done, I think, by that Commission, but it was as a foundation for future work. The Duke of Marlborough took a very active and a very efficient part in promoting the work, and our leading farmers and country gentlemen, Mr. Harcourt and Lord Norreys, and others attended. There was a very good attendance. The works of the Commission, I think, was very efficiently done.

656. Are you satisfied with the jurisdiction of the Thames Conservancy as far as their jurisdiction.

*Chairman—continued.*

tion goes over the upper part of the river?—No, I am not satisfied with their jurisdiction.

657. What are your grounds of dissatisfaction?—The first is that there are two things required to make a useful board of management, more especially where there is a large revenue to be raised. The power that has to administer that revenue must not only have the ability and the integrity that would enable them to do it, but must also be acceptable to those whose money they spend. I have nothing to say against either the ability or the integrity or the zeal of the present Conservancy Board; the only criticism that I could have to make upon the way in which they have done their business is that they have trusted too much to their own knowledge and judgment; they have not shown that disposition to avail themselves of local knowledge which they ought to have shown. For instance, although I have been personally connected with the drainage of no unimportant part of the bank, I have never had any notice, nor have I known anybody that has had notice, of their coming down to see it. I have always supposed that it was part, I will not say, of their duty, but it would have been a better exercise of their discretion when they had come down to have given to the people interested in the locality an opportunity of stating their views. As far as I know they have not given to the local people an opportunity of stating them, and that is one reason, no doubt, for their unacceptability. About their unacceptability, whatever other may be their merits, there can be no question that they are unacceptable alike to town and country; I mean so far as my own opportunities of knowledge go. The only fault that I have to find, and it is not a very serious fault, considering the multitude of the works that they have to do, and the smallness of the funds that they have had to do them with is, that I think that they have given up too readily all the navigation of the Upper Thames, between Lechlade and Oxford. At any rate there is a very great difference of opinion upon it; my own opinion is that that is a navigation which might be advantageously restored. I remember very well when Radcot was the great centre of supply, or the place of supply, of coal for a great many neighbouring villages, and three or

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*Chairman—continued.*

four miles below Radcot, there is Tadpole, which had also a considerable coal wharf. Both of those have entirely fallen into disuse, or you may say almost entirely. Not only have the Thames Conservancy done nothing to keep up the navigation, or to consider its restoration, but they have done a good deal to make it difficult not to say all but impossible to continue it; that is to say, they have very hastily, in my opinion, removed the weirs between where the navigation begins, at what is called the Round House at Lechlade, and lower down the river; I think they have removed eight or nine weirs. Of course the removal of the weirs very much adds to the difficulty of navigation; I need not show how that operates; but in spite of the difficulty there is some navigation, and some coal brought by the river; and when a very considerable mansion was built within three miles of Farringdon, which is close to the property with which I am connected, there was a considerable portion of the materials, indeed, as I have ascertained from the report of the builder, there were 70 tons of materials brought down by the river; 70 tons is not very much, but I went yesterday to look at the state of the river in that part, in order that I might have the most recent information, and I saw the man who used to keep the weir there, which was one of the weirs which was abolished, and he said that the boats were very unwilling to come there on account of the difficulty of getting back. Of course he would have a prepossession in favour of the navigation and the use of the weir; but that is the fact, that there is very great difficulty in getting any people to navigate on account of the difficulty of returning; but he believed, and two other people that I saw, whose opinion I think is entitled at any rate to be regarded as the representative opinion of the people down there, that it was possible to revive the navigation of that district.

658. May I ask, while you were on the Drainage Commission, did you make any communication to the Thames Conservancy upon the point of their neglect of the navigation of the upper part of the river?—I forget; I am not aware that I did.

659. On the other points on which they have rendered themselves unacceptable, did the Drainage Commissioners represent those points to the Thames Conservancy?—No, I do not think they did.

660. Did the Thames Conservancy have any correspondence with the Drainage Commissioners?—I do not remember.

661. Then, perhaps, the real state of the case is that you have both kept each other at arm's length?—Something like that. But I was not speaking as a drainage commissioner; I was rather speaking as an inhabitant, as a person locally connected with the management of the Thames, and as being a member of a small drainage board. I have had myself some communication with the Board of Conservancy. It was a small matter, but it was not altogether satisfactory. The floods were aggravated last year by the breaking down of the towing-path. I wrote to them once or, I think, twice, as being connected with that district which was suffering from the floods, that the flood was aggravated, and partly caused by their having allowed the towing-path to be broken down; but they took no notice of the communication. Some months

*Chairman—continued.*

afterwards they did repair it. I have also had occasion to communicate with them on the annoyance and loss which occurred to the tenants of the college, of which I am a member, from their not keeping up their gates of the towing-path. Of course it is their business, as they have not renounced the possibility of navigation, to keep up those gates; and in consequence of those gates not being kept up there were constant invasions of the land, in which our tenant is interested, by cattle and sheep from the adjoining lands. That is but a small matter; and they had too many things to attend to, probably; but they did not attend to it as they might have done.

662. Are you an owner of land in the neighbourhood of Oxford, along the Thames?—Yes, connected with the district which has been drained, and which is specially interested.

663. Have you any information to give the Committee with regard to Sandford Lock, as affecting the floods or the navigation?—No, I have no information, except what all the Committee know of, that there is a very great fall, and that there is a block there.

664. Is there any suggestion that you would make to the Committee as to preventing or alleviating the floods in the valley of the Thames?—No, my opinion upon any question of engineering is worth very little, and I would not offer it to the Committee. The points which I have chiefly considered are what would be the most acceptable, and, therefore, the most efficient mode of administration, and the mode of raising a revenue to carry into effect the objects which the Board, or the power whatever it is, ought to have in view.

*Sir Trevor Lawrence.*

665. With regard to that cessation of the navigation to which you have referred, is not that mainly due to the alteration of the method of conveying coals: are they not brought by railway now instead of by river?—No doubt it is so. I do not know whether this would be the proper place to observe that one of my reasons for wishing to restore the navigation for the purpose of coals, is that considerable inconvenience and danger to the public has arisen from the excess of that traffic on the railroads.

666. As compared to the injury that is done by severe floods, the advantage that would be gained by measures directed to restore the navigation would be very small, would it not?—Both would go together. I suppose if the river was in that state that it was most available for navigation, you would have a greater command over it both in winter and in summer.

667. But if there were any opposition between the measures which it would be necessary to take with a view to controlling the floods as compared to those which would be necessary to take to restore the navigation, the more important object is the prevention of floods?—Yes; no doubt the navigation is quite a subordinate object, but at the same time I would not wish to attach undue importance to the floods. In my estimation the primary object in the management of the river is to have water enough in the summer. As far as I have any knowledge or experience of the river, that is the great object to be secured in the management of the river.

668. If you have kept the Conservators of the Thames

*Sir Trevor Lawrence*—continued.

Thames very much at arm's length, you have hardly taken advantage of such opportunities as there might have been to ascertain whether they were or were not acceptable, have you?—What I may call the isolated behaviour of the Conservancy dates from some time before the existence of the Thames Valley Drainage Acts. They have always trusted, as it seems to me, not exclusively, but trusted more than they ought to have done to their own judgment, and to their own means of knowledge.

669. The Conservators have a veto, have they not, upon measures that are proposed to be taken locally to improve the river?—Yes.

670. And it is necessary for them before they give their assent to any measures to send their surveyor down, is it not?—Yes.

671. And that involves considerably increased expense?—Yes, I suppose so.

672. Do you take that objection or not?—No. I do not take that objection.

*Mr. William Cartwright*.

673. Do I understand you rightly, that you give your evidence not merely as an old Drainage Commissioner, but also from the experience which you have had for a number of years, and from an acquaintance with the land in the valley of the Thames?—Yes.

674. When you say that the Conservancy is unacceptable to those who live down in the valley, would you say that its unacceptability is due to the actual principle of the constitution of the Board of Conservancy, or merely to the composition of the Board?—I should say more to the composition, and to the distance at which most of them reside.

675. When you speak of their composition, do you mean that the different interests of the river are not adequately represented upon the Board of Conservancy?—I should say that they are not adequately represented on the Board, and it is not merely that they are not adequately represented, but that they are mixed up with a great many interests with which they are entirely unconnected.

676. Then your objection strikes at the very principle of the constitution of the Board of Conservancy?—Entirely.

677. And not merely to the composition of the Board?—No; I think that the beginning of all useful dealing with the Thames is to extinguish altogether the rights of property and government of the Thames Conservancy above Teddington Lock. I think that is the first condition of dealing satisfactorily with the management of the Thames.

678. That is the broad principle upon which you go?—Yes.

679. When you gave your experience as to the indifference of the Conservators in particular cases, you said that you had made representations to them, and that they had treated those representations with indifference?—Yes; I would rather give it as my evidence that they have too many things to attend to, and that they cannot attend to them.

680. What is the nature of the difficulty; did they answer your letters at all?—I think they answered one; but I do not lay any stress upon that. There was no intentional want of courtesy, I suppose; but I only gave you that as evidence that they cannot attend to those details, which,

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*Mr. William Cartwright*—continued.

nevertheless, are of considerable importance to those who live along the river.

681. How long were you a Drainage Commissioner?—During the whole of the first period, three years, I think, until very recently; I forget what is the date of the Board, but it was until the new Board was elected, and I was very regular in my attendance.

682. There are some Conservators who are elected in the upper river, are there not?—Yes.

683. Have you ever taken any interest in the election of those representative Conservators?—No, not recently.

684. With regard to the navigation of the upper river, I think you said that you had particular experience of the navigation in the neighbourhood of Farringdon, and you mentioned that materials had come down the river, and that there was some difficulty about the navigation?—Yes.

685. What distance did those materials come from?—I do not exactly know where; but from the Lechlade side.

*Mr. Hall*.

686. I gather from your evidence that this board is unacceptable, in your opinion, because it is not sufficiently representative?—As a distant and a metropolitan board dealing with what is essentially country interests, or the interests of country towns.

687. Is your objection because it is distant, inasmuch as it sits in London; or because it is not composed of men who have the interests of the Upper Thames at heart?—Both.

688. It is inconvenient it sitting in London, because of the people who would know locally most about the Upper Thames being unable to attend?—That is a small part of the matter; it is because it is mixed up with London interests and the port of London, with which we have nothing whatever to do; the going up to London would be a small matter.

689. You have said that you would like to extinguish the management of the Conservancy above Teddington Lock; would you, in the place of that Conservancy so extinguished, propose to the Committee the formation of any other board of management above Teddington, or of two boards above Teddington, with the supervision of any other power?—I would suggest to the Committee the formation of one board; because, on the whole, one board like that of the Thames Conservancy would have the advantage of unity. I would have one general board for general purposes. Of course there would be local district drainages acting in subordination to that; but for the management of the bed and the banks of the river, and regulating the navigation of the river, I would, returning to the old principle, have one board. Perhaps while I think of it, the Committee would allow me to say that I would have it specially for the purpose of keeping up the flood banks on either side. Now flood banks are formed in one place or another as they are wanted for the purposes of the drainage of the district. You are not bound to have a flood-bank, but you may have a flood-bank. Of course, the effect of a flood-bank is to keep the water out of the grounds that are protected by it; but the effect of that is to aggravate the mischief to the persons below. Then, of course, it would be the business of the proprietors below to have a flood-bank too, and they are entitled to have a flood-bank. But supposing

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*Mr. Neate.*

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supposing you have 50 miles of river, and 40 miles of that on each side is protected by a flood-bank, of course, that would aggravate the mischief to the 10 miles below, and those 10 miles below may have their own flood-bank, and so on. I think that is a matter of duty, and not merely as a matter of interest to those who are concerned in it, the central body should make a flood-bank on either side of the river. Then there is another grievance, that when the flood comes down we want a flood-bank above us. I know in the case of the property with which I am connected, a good deal of our flood takes us in the rear; it comes out of the Thames half-a-mile or a mile above us, and if the valley was properly drained and the river properly confined by a flood-bank there, a great deal of our flood would be avoided.

690. That is the reason why you want one board above Teddington Lock?—Yes, I want one board above Teddington Lock, because Teddington Lock is a lock of great importance. There is another point for which I would want one board, and that is because you cannot have effectual management unless you have all the levels of the water at every place where there is a stoppage, that is, at every lock and at every mill under the control of one board. There ought to be at the highest point of the river, and at one or two other points, a telegraph office, who might send a message saying, "Great rains here and floods;" and then the order would go to let go lower down. The floods are very much aggravated by the delay that arises between the rainfall and the letting-go below. They wait until the flood comes down. If they are quite sure that the flood is coming down they should let go the water, so as to increase the rapidity of the flow. For another reason, I think that there should be a central board, that should have possession of all the mills, and that is, that nothing effectual can be done unless the Board that has the management of the Thames has also the control of the mills. That, of course, requires money to buy them up; and the level of the Thames in every place should be fixed, not as now, very much with regard to the mills, for that the mills should exist entirely as subordinate, and the navigation also. I do not wish to exaggerate the importance of the navigation, for both the mills and the navigation should be entirely subordinate; and the levels which are requisite, either for the navigation or for the mills, should be fixed, without reference to the needs either of the navigation or of the mills, but with reference to the utility of the river, both as providing an efflux of water in the winter, and as a water supply in the summer.

691. Will you explain to the Committee your view that the navigation of the river and the rights of the mill-owners should be subordinate to the prevention of floods?—I meant not only to that, but also for the preservation of the water in the summer. I have heard people who have studied the question say that they think that the mills should not go at all in the summer.

692. But you are quite clear that one board is sufficient; just now you expressed an opinion that the present Thames Conservancy was objectionable, because it was too distant; if you had one board above Teddington Lock, reaching from Cricklade to Staines, would not the upper parts of the River Thames feel that their interests were not sufficiently guarded, or, in the lower

Mr. Hall—continued.

parts, that their interests were not sufficiently guarded; is it your opinion that one Board would be sufficient for the whole of that distance?—Yes; they would be satisfied if they had a proper representation. Of course, they would not be satisfied unless they had a proper representation. But it is not merely the want of representation, it is the metropolitan character of the present Board, and its connection with the port of London, that is so objected to.

Mr. William Henry Gladstone.

693. Can you give the Committee any idea of the damage done by floods to any of the property with which you are connected?—My own opinion is, that although we have endured it for a great many years, we have suffered very little from the floods. My own opinion is that the damage done by the floods is very considerably exaggerated. There was rather a striking incident which occurred to me yesterday. I was walking down the flood-bank near the property with which I am connected, and I noticed that on the part between the flood-bank and the river there seemed to be better grass than on the part protected by the flood-bank, and when I noticed that to the man with whom I was walking, who is a weir-keeper, and who also is a small farmer, he said, "Oh, yes, it gets all the water." It was evident that the part that got the river water was better than the part which was protected by the flood-bank. And I know in connection with the drainage with which I am connected, that the property of Sir William Throckmorton was so well drained, that he was obliged to stop up the water to prevent it going off too soon; there was a great deal of over-drainage. But at the same time there has been, especially during the last two or three years, a very great loss, because the low lying flat lands lying at some little distance from the river which received the water have no means of getting rid of it.

694. The water remaining stagnant?—Yes; you may have lands rather lower than the land below in the course of the river. I know of grass lands that have suffered a good deal.

695. Would that be frequent?—Yes, it would be frequent, certainly.

Mr. Richardson-Gardner.

696. In your answer to the honourable Member for Whitby, you told us that you think that the damage is very much exaggerated, and you then went on to explain that that applied only to the land; you do not include the riparian towns on the banks of the Thames in the statement that you think the damage exaggerated?—Yes, I do. I think in Oxford we have much more to apprehend from drought than we have from excess of water. If we had two or three seasons so exceptionally dry as the two or three last have been exceptionally wet, I think we should suffer very much more inconvenience, and worse than inconvenience. Of course there are some parts which are very low, which have suffered a good deal of inconvenience; but the observation, I think, of those who are best acquainted with Oxford is, that the wettest seasons are the healthiest.

697. Perhaps your experience does not extend to Staines and Windsor in the time of flood?—No.

698. You can say nothing of the towns on the river except Oxford?—No.

699. Except

*Mr. Richardson-Gardner*—continued.

699. Except from hearsay?—Except from hearsay.

*Mr. Walter.*

700. You spoke just now about the floodbanks; can you tell the Committee what extent of floodbanks there is along the course of the Thames above Teddington?—No, I cannot at all.

701. Can you tell us whether, within your experience, they have been raised at all?—They have been raised and renewed in the part with which I have been connected, or, more properly speaking, they have been restored to their original height and repaired.

702. Have you any opinion as to the comparative advantages of lowering the bed and keeping the bed down by constant dredging, so as to remedy the setting up, and that of raising the bank, which is really lowering the bed in the opposite direction, in order to keep out the floods?—The effect of a floodbank goes very much further than anything you could do by deepening and dredging. It has the effect of widening the course of the river. You have the ordinary course of the river and the river bank, and then you have, in the wetter times, a wider course of river.

703. What distance is the floodbank from the margin of the river generally?—I should say 50 yards, very often; sometimes it is nearer; the floodbank cuts off the corners a good deal.

704. Then it increases the area of the bed of the river to that extent?—Yes.

705. As regard the interest of the landowners, do you not consider that the floodbanks are disadvantageous, inasmuch as they tend to obstruct the drainage of the land?—Of course floodbanks if not corrected must be objectionable. We must have sluices in them; they should not be left entirely to the local people. I think there should be a central control who should say to the different landowners and those interested in the different drainage districts where they might have sluices, and where not. Every now and then you may have the water outside the floodbank higher than the water in the river, and a floodbank in that case would of course be a very great impediment to the efflux of the water. But the management and control of the floodbanks should be subject to a central authority, which of course would deal with them on the application of the district, but still subject to the control of that one board, if the power of that district drainage was abused. There is one point which I think of great consequence to the effectual drainage, and that is the removal of the exemption from taxation, I am speaking against my own interest in the matter, but in the Thames Valley Drainage Act, where there had been a previous inclosure and drainage, they are exempted from taxation, and even to the arterial taxation they can only be taxed by their own consent, and it will be a very great impediment in the way of the effectual drainage of the Thames if that exemption is not done away with.

*Chairman.*

706. Supposing there was one central authority with a subordinate drainage authority, would you say that the owners of land in the valley of the Thames would object to pay the needful rates for  
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*Chairman*—continued.

carrying out the works that might be deemed necessary?—No, I think not.

707. Would your brothers, landed proprietors in the neighbourhood of Oxford, object under those circumstances?—No, I do not think so; they may take rather too exclusive a view, but I do not think that they would object to any reasonable expense for the benefit of the land. They might not perhaps take sufficiently into account the benefit that the use of the river may be to the town, but that it must be left to the towns to pay for it.

*Sir Trevor Lawrence.*

708. If the winter floods were kept entirely off the meadow land adjoining the river, it would be a considerable injury to the meadow land, would it not?—Yes.

709. Last year, for instance, when there were very high floods, was the hay on the meadow land adjoining the river in your part washed away at all?—Yes, but it was more the year before that; the year before that there was a very great loss of hay through it being carried away by the floods.

710. So that what you want to do is, to regulate the occasional floods in summer even more than to hold in check the winter floods?—Yes. However, the winter floods, if they remain too long, do a great deal of harm.

*Mr. William Henry Gladstone.*

711. Do you think it would be feasible to rate house property for the purposes of drainage?—It would be a general rate. I should put it generally upon the town. I think you should have the rate in a lump according to your rateable property, not rate each individual. But supposing the rateable inhabitants of the city of Oxford had to contribute, it should be put in that way as so much to pay. Then there are sources from which I think a considerable revenue might be derived. I think more revenue might be derived from pleasure boats than is derived, and that is according to the view of the Thames Conservancy.

712. The rates have been lowered upon pleasure boats, I believe?—Yes, and they only pay when they go through a lock; but they equally have the benefit of the lock, whether they go through it or no. With regard to the liability of towns, I might be permitted to observe that the condition of the towns has undergone a very great alteration of late years; all the towns used to use the river chiefly for the efflux of their sewerage when their sewerage was less than it is now. Then comes legislation compelling them. The first legislation is that they are to have no cesspools, and then the evil of allowing the sewage to flow into the river was felt to be so great that they are forbidden to take their sewage into the river; so that that is a very considerable hardship upon the towns for which they have had to pay a great deal; for instance, we at Oxford shall have to pay something like, probably, 150,000*l.* for keeping our sewage out of the river. We may get some little return from it, but it will be very small in comparison with the outlay. Then, that has increased the dependence of the towns upon the river as a source of supply of water. It is reasonable enough that each town  
G upon

*Mr. Neate.*

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Mr. Neate.

Mr. William Henry Gladstone—continued.

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upon the Thames should pay for its supply of water upon the same principle that the city water companies are made to pay for the purity of the river. If one can take into account the hardship that is now being done to them in their being put to that expense for purification that hardship is greater at Oxford than at any other place, because there is no other considerable town from whose sewage we should desire to be relieved; we are the first considerable town upon the river, and we really do not need for the preservation of the purity of our own water, the protection of the law which forbids us to carry our sewage into the Thames.

Mr. Hall.

713. Is it not the case that the very fact of a city like Oxford having spent a considerable sum of money on drainage works, and thereby purifying the water, enables the Conservators to get a large income from the water companies for the water so purified?—Undoubtedly.

714. And, therefore, it may be fairly considered that they have paid a considerable sum of money towards earning the income to be used on the

Mr. Hall—continued.

river?—Yes, decidedly, that is the condition of the water companies giving anything.

Sir Trevor Lawrence.

715. Is it the opinion at Oxford that the floods affect the health of the population?—There is some difference of opinion amongst the doctors, but I have no doubt that low fever may prevail in the very low-lying parts of the town.

716. Is that the general opinion?—That the harm, in a sanitary point of view, the floods may do is very limited indeed, and that the general health of Oxford is very much better in a wet season than in a dry one. With regard to the 5,000 £, perhaps the Committee will allow me to mention as affecting the question of the constitution of the Thames Conservancy, that if the old Thames Navigation had known of this 5,000 £ I do not think that they would so willingly have given up, as they did. I do not think that the local bodies would have abdicated their right to manage their own river if they had known what was only known at the end of the Committee of which I was a member, that 5,000 £, which was afterwards increased to 6,000 £, would be given towards keeping the river in order.

Mr. JOHN TOWLE, called in; and Examined.

Mr. Towle.

Chairman.

717. ARE you an Alderman of the City of Oxford?—I have been, but I am not at present.

718. Are you now a member of the Council?—I am a member of the Council so far as being a magistrate.

719. You have heard the evidence given by Mr. Neate; are you of opinion that supposing there was one central body exercising jurisdiction over the whole of the River Thames, with a subordinate body to take care of the drainage, under those circumstances the town of Oxford would object to be rated for carrying out the needful works?—I am sorry to say that there is a great deal of selfishness on the part of the people of Oxford with regard to this; Oxford imagines that it is more of a land question than a city question, and they have uniformly opposed everything that I could bring forward, for I am deeply interested in the question, having had four mills to do with; they have uniformly objected to take the matter up against one certain obstruction on the river, and that is Sandford Mill.

720. Is Sandford Mill yours?—No.

721. Is Sandford Mill used as a paper mill?—Yes, it was burnt down two or three years ago, but it has been temporarily put up again; I do not know that I ought to say temporarily, but it is built again.

722. Has the head of the mill been raised?—Yes, nearly half as much more than it used to be.

723. How many feet?—From five to nine feet; they claim to have nine feet fall, and it used to be five feet fall within my recollection. That is the great obstruction and the whole question.

724. Is it Sandford Mill alone that you speak of, or Sandford and Iffley combined?—I am speaking of Sandford alone.

725. Has the head of Iffley Mill been raised?

Chairman—continued.

—I think it has not inasmuch as the Sandford Mill has taken the fall away from the Iffley Mill, which is mine. There is a loop there, and the Weirs Mill is upon the loop, and the Iffley Mill is upon the main stream.

726. Do you get less power in consequence of the head of Sandford Mill being raised?—Yes; in fact, it is good for nothing; it has totally done away with its usefulness, because they have kept on encroaching from that time to the present.

727. Therefore you find yourself injured at Iffley Mill by the raising of the head of Sandford Mill?—I ought to say that I take it for granted that the parties are injured.

728. Do you get less rent for it in consequence?—I do not think I do.

729. Do you consider that by raising the head of the mill the navigation is injured?—The navigation is injured most assuredly; they have done it with a view of benefiting themselves.

730. As regards floods; how does it affect the floods about Oxford?—It keeps us through the winter in one continued flood; there is 4 ft. 7 in. full in the highest floods. We have had very high floods these last two years past; but the highest flood was in 1852. There was 4 feet 7 inches of fall at Sandford, above this lock, and then if you consider 4 feet 7 inches penned back from Bagley Wood Hill on the one side to Sandford Churchyard on the other, and an embankment thrown up in this flat country where there is not a fall of two feet in the mile, you can form your conclusions as to how far that must pen up the water of the country, and then it is kept there for the sake of making a pond to the mill; it is shut in long before it is off the meadows, to make a greater fall to the mill.

731. By whom was that bank formed?—By Mr. Swan.

732. Under whose instructions?—Mr. Swan bought it for himself; it was a little flour-mill, and

*Chairman*—continued.

and Mr. Swan was a great paper-maker, serving the Clarendon Press with paper. They wanted more paper, and he bought this mill, and built it upon this construction, and it ruined him, and it has ruined everybody that has ever come to it, and that is a great many. Nothing could have been more unfortunate for the country, and for the parties; than to have anything to do with the Sandford Mill. I have offered a 100*l.*, and advertised, over and over again, my willingness to bear my share towards lowering this bank, and letting them take what course they would. I will find the pickaxes and shovels, and I will give a 100*l.* towards any lawsuit that is brought against us.

733. Are you aware whether the Thames Conservancy have taken any steps with reference to this bank?—The present Thames Conservancy no sooner came into power than they immediately were induced to put in a long lasher at very great expense, which never runs over until it is over the meadows. I am speaking in the presence of the gentlemen who did it.

*Sir Trevor Lawrence.*

734. Was the head of Sandford Mill raised before the Conservators had that part of the river under their control?—Yes, it was raised in the year 1820.

735. So that the Conservators had nothing to do with it?—They had nothing to do with raising it. What they did do was with a view of doing good; but it was a mistake, and they did not make the lasher to be one bit below the level of the meadows, and therefore the water has got to run over the meadows; it will not run over this lasher. If they had made this lasher a great many feet longer, and have lowered it a foot, it would have been very beneficial; but instead of that, it is on a level with the meadows now to be seen. It was a great mistake, and great expense, and no good.

736. You say that you are the owner of four mills; do those four mills affect the floods in the part of the river where they are located?—Yes; the Weirs Mill ought to be removed; it was built in the olden time, and is built right across the whole bed of the river, and although I am working that mill, I say it ought to be done away with.

737. Is there one mill called Weirs Mill?—Yes; and if they were to move it the water would be very seldom over Christ Church Meadow; whereas now it is almost constantly over Christ Church Meadow.

*Mr. William Henry Gladstone.*

738. This is on a side stream, is it not?—Yes; this mill is on the loop which comes in again at Sandford. It leaves the main stream at Folly Bridge, and comes in again down at Sandford. It has always been considered a very powerful mill; in fact, I have done very well at it so far; but it has been with great care and industry.

*Mr. Hall.*

739. Has any proposal to abolish this Weirs Mill ever been made?—Yes; I was offered 1,750*l.* for it, and I said it is let for 100*l.* a year, and I cannot consent unless you give me 2,000*l.* I do not know whether that offer of 1,750*l.* is still in abeyance or not, or whether I could have it now; but I should be ready to take 0.114.

*Mr. Hall*—continued.

a reasonable price for it, for it certainly ought to be done away with. 8 June 1877.

*Mr. Tomle.*

*Chairman.*

740. Who offered you the 1,750*l.*?—Mr. Stacey, of a mill higher up the stream, at Wolvercot.

741. Was that for the purpose of maintaining the mill?—No; he was employed by another party to buy it for them, and to pull it down.

*Mr. Hall.*

742. Was it at the instance of the Conservancy Board, do you suppose?—No, they had nothing to do with it.

743. It was not for the sake of the navigation of the river, but for the sake of speculation; was it to benefit another mill?—No, I think it was for the benefit of the town. I think that the University was at the bottom of it, but I never exactly knew. I fancy that the University was at the bottom of that offer of 1,750*l.* I must tell you that I was on the Committee of the Old Navigation for some years, and, therefore, I have had a great experience of this river. I have lived upon it for 60 years, and there is no man now living who knows more about it excepting one of the old boatmen who really ought to be examined before this Committee. He was one of the old boatmen who used to navigate the River Thames from Gloucester to London, connecting the two seaports during the time of the French war. And at that time Mr. Wyatt, for that is his name, navigated that river with a boat of 150 tons, whereas, as the Thames Conservancy make us believe, that a mere coal boat of 30 tons could not pass if they were to lower Sandford Lock. I may say that Sandford Lock is the fall of the Thames. I have gone hundreds of miles to see a great deal worse waterfall; it is the real fall of the Thames, and when there is a flood it is grand to see the fall; it is the very throat of the Thames between Bagley Wood Hill and Sandford Churchyard. If it had not been so narrow they could not have thrown up the embankment, but they have thrown up an embankment, and they have put stoppage places along every ditch which are to be seen, and even the railroad side-cutting bringing down floods from the west are bridged over at this place, so that floods accumulate, and runs over the rail; all the floods unite and are brought to dead-lock at this fall of the Thames, or the railroads turn the floods round till they come right up to the top of them.

*Chairman.*

744. Is the Mr. Wyatt to whom you allude, the same Mr. Wyatt who gave evidence before the Rivers Commission?—Yes.

745. Did he navigate a boat called the "Brimstone," of 150 tons?—Yes, that is the man. I made these extracts from his evidence in the Blue Book, and I will put them on the table (*delivering in the same*).

746. How was it that he got up the river with the "Brimstone"?—He went from Gloucester to London, connecting the two seaports.

747. We are now speaking of the Thames; how would he go?—He would go to Lechlade, and, I suppose, the canal would connect the Thames and the Severn. I do not know that part of the country, but they made use of the river all the way above Oxford, and down to this point; they always came through this lock, they had



Mr. Towle.

Chairman—continued.

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had nowhere else to come through with their 150 tons.

748. You state that in this boat, the "Brimstone," of 150 tons, he worked his way through from Gloucester to London, through Sandford Lock?—Yes, through Sandford Lock; there was no other navigation between the two ports during

Chairman—continued.

the French war, which I have a perfect recollection of, being 83 years old. I made those extracts from the Blue Book in which you have the whole of the examination of that man as to what was going on at that time. It was the evidence taken by Mr. Rawlinson when the Rivers Commission was sent out.

Mr. ROBERT ELLETT, called in; and Examined.

Mr. Ellett.

Chairman.

749. You are the Clerk of the Cricklade District Board of the Thames Valley Drainage, I believe?—Yes, and of the No. 2 or Lechlade District.

750. And you are member of the firm of Mullings, Ellett, & Co., of Cirencester?—Yes.

751. You are also agents for several of the landowners upon the Upper Thames Valley?—We are.

752. Between Cirencester and Oxford?—Between Cricklade and Lechlade, and also in the district not shown upon the map on the wall above Cricklade.

753. Is there any navigation now on the river beyond Lechlade, above the junction of the Thames and Severn Canal?—None whatever, nor for many years past; in fact, scarcely within the memory of man.

754. Was there formerly; and, if so, up to what time?—Formerly there was up to Cricklade; but not since the construction of the Thames and Severn Canal, which joins the Thames just above Lechlade.

755. Are you able to inform the Committee up to what date there was a navigation in that part of the river?—I am not, of course, speaking of my own knowledge as to that, but I believe that the date of the Thames and Severn Canal Act was something like 1780.

756. And for how long was that navigation in operation?—I believe that the canal was constructed promptly afterwards; and that from that time the navigation, such as there has been, has been entirely over the canal and the river below the junction, and none whatever over the upper portion of the Thames.

757. You feel that the important point is the drainage of the land?—The important interest in our district is undoubtedly that of the land drainage.

758. Do the landed proprietors look forward to the navigation being re-opened at the upper part of the river; and would it be an advantage to them?—I gather the feelings of the landowners to be that the navigation in our district is the subsidiary interest; but that it is quite consistent with the land drainage, and that the two may well go together.

759. You have heard two witnesses state their opinion that one central authority to have jurisdiction over the whole river with the drainage authority, who should be subordinate to them, might probably work well; what is your opinion upon that point?—My opinion is this, that the plan adopted by the Act of 1871 is the best, and the one that would work best, that of entrusting the local works of drainage to district boards, such as have been elected under that Act, and to have either one or two central bodies, taking the Thames from Lechlade to below Oxford, and from

Chairman—continued.

thence to Staines, who should have a controlling authority over the district boards, and who should have the power of maintaining the navigation.

760. But supposing that some general scheme of flood-banks were necessary, and there being two authorities, the Thames Conservancy and the Drainage Commissioners, and a conflict of authority ensues, how would you meet that difficulty?—As regards works affecting the main stream, I would meet it by leaving those works subject to the control of the central drainage authority, that is to say, the Thames Drainage Commission.

761. Then you would make the Thames Drainage Commission the superior authority?—Yes, and the sole authority, except the local district boards for executing local works.

762. And the Thames Conservancy subordinate to the Drainage Commission?—An entire cessation of the powers and jurisdiction of the Thames Conservancy so far as the upper river is concerned.

763. You would get rid of the jurisdiction altogether of the Thames Conservancy above Teddington Lock?—Yes, quite so; and remit the Conservators to their old jurisdiction.

764. And you would hand that jurisdiction over to the Drainage Commission?—Quite so.

765. Then you would have two distinct authorities, one having jurisdiction over the Thames below Teddington Lock and the other over the whole of the Thames and its tributaries above Teddington Lock?—Quite so, unless that upper portion were for convenience sake sub-divided into two.

766. You are certainly in favour of two, and possibly three bodies to have jurisdiction?—Yes, I am in favour certainly of two and possibly three; the Thames Conservators, in respect of their old district, the lower Thames, and either one or two boards of Drainage Commissioners, to take from Teddington upwards.

767. You were engaged by the landowners professionally, were you not, to oppose the Thames Conservancy in 1870?—I was so; and their feeling was universal for a considerable number of miles that I am personally acquainted with, that in every respect the Thames Conservancy Board was an entirely unfit and unacceptable body to have power over that district.

768. You look upon the Thames Conservancy as rather a nuisance, as affecting the interests of the landowners?—We know of no good that we have derived from them; and we are satisfied that the only works that are necessary to be done in the upper Thames can be better done by a body that does fairly represent the interests concerned.

769. The Drainage Commissioners, I believe, have

*Chairman*—continued.

have not, as yet, taken any steps to remedy or modify the floods in their district?—They have not; but the Drainage Commissioners only came into office in September last, and therefore they have not had time to effect any works at present. The Act of 1871 did not define the lands which should form the district of the Thames Commissioners, but left that to be subsequently done; and the time was occupied, as I believe has been explained to the Committee by Mr. Hawkins, the secretary of the Commissioners, in obtaining a survey from the Ordnance Department, and in getting the district settled under the authority of the Enclosure Commissioners. It was only in September last that the Commissioners and District Boards were in working order; and speaking as regards No. 2 District, for which I am concerned, that Board immediately set about the preliminary steps for executing works in this district. They are at this moment giving the necessary notices for executing works on the River Cole, which is one of the tributaries in their district.

770. That runs through Cirencester, I think?—No; it is the river which is incorrectly described as the Colne on the plan; it is the river which joins the Thames near Lechlade and passes Coleshill, the property of Lord Radnor.

771. What is the river called at Cirencester?—The Churn. That is not shown at all on the map.

772. One source of the river is immediately near Cirencester, I believe; within two or three miles of it?—Yes; Thames Head, at Kemble.

773. The Conservators opposed your Bill, did they not?—They did; they opposed that Bill, and obtained the introduction of clauses giving the Conservators a veto upon any work proposed to be done by the Commissioners or local boards, subject only to an appeal to the Board of Trade, and as a matter of fact, district No. 2 Board, has felt that the machinery for putting that Act into operation as regards their district would be too expensive, and it is a complete bar to the execution of the very necessary but simple works that are needed in the Thames in their district. They are at this moment precluded from executing those works by the machinery of that Act of 1871 which has been forced upon them by the Conservators.

774. Then under present circumstances there is an entire want of harmony between the Drainage Commissioners and the Thames Conservancy?—We regard it as an obstruction which is simply impossible to be got over and unworkable.

775. This power of veto on the part of the Conservators is an obstacle to any works which you desire to carry out?—It is.

776. What kind of works do you propose carrying out?—They are works which in the opinion of the Board which I represent are necessary in their district; they are very simple, indeed, such as cleansing the river by cutting the weeds and removing the obstructions and accumulations which have arisen in the course of years from want of the river being properly looked after.

*Sir Trevor Lawrence.*

777. Those are what you call flams?—Yes, they are formations, little islands, in fact, that are formed in the bed of the river through the accumulation of soil and decayed vegetable matter from the weeds being neglected.

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*Chairman.*

778. But No. 1 Cricklade district, is not, I believe, within the jurisdiction of the Thames Conservators?—Not at all.

779. And you are clerk to that board?—Yes.

780. What works have you carried out?—We were only appointed some time in September last, and the surveyor has made a report to the Board, which is now under consideration, with a view to giving notices for executing the works.

781. And there you will have the great advantage of being free from any veto on the part of the Conservancy?—Quite so.

782. Which I presume you consider a great advantage?—We do.

*Mr. Hall.*

783. Subject to this veto which hinders you in accomplishing any work, have you not power under the Act to apply to the Board of Trade as against the Conservators?—Yes, we have; but inasmuch as that would involve the preparation of expensive plans in the first place to be submitted, and then no doubt an inspection by some engineer sent by the Conservators, we regard the whole thing as expensive to a degree beyond what the simple works required would justify.

784. Just now you said you would be in favour of two bodies of drainage commissioners to divide the upper waters of the Thames: supposing it were the case that you had those two bodies constituted, and they disagreed as to the work to be done, must you not have some reference, and would not you get into some difficulty with regard to that; you have now the power of reference to the Board of Trade?—I assume that there would certainly be an appeal-authority; probably the Enclosure Commissioners might be the best authority, as they would be dealing with drainage works substantially.

785. That would land you in the same difficulties of expense in preparing your case as you are in now, if you ventured to go against the veto of the Conservators?—But that would only arise in the event of any question existing between the Oxford Board, if I may so call it, and the Board having jurisdiction over the lower part of the river in which more serious interests are involved.

786. But such conflict of opinion is quite possible?—Yes, such conflict of opinion is quite possible, and I would provide for it by an appeal authority.

*Chairman.*

787. And that authority, you suggest, should be the Enclosure Commissioners?—I do, as being a body better adapted than the Board of Trade for the regulation of a district in which the prominent interest would be that of drainage and not that of navigation. That, I should say, is of course a matter of detail, and my individual opinion.

*Mr. Hall.*

788. Your present powers extend from Cricklade to Long Wittenham, do they not?—Yes.

789. Why do you propose to divide the river at Oxford; why not from Cricklade to Long Wittenham, and Long Wittenham to Staines?—I do not propose to divide it at Oxford. I used the phrase only as an expression, giving a name to the upper district.

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790. So

*Mr. Ellett.*

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Mr. *Ellett*.

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Mr. *Hall*—continued.

790. So that you proposed that the body should have power from Lechlade to Oxford?—No; I meant to convey that I would propose one body from Cricklade, or from Lechlade really, to the present lower boundary of the Drainage Commission at Long Wittenham.

791. And the next, from Long Wittenham to Staines?—Yes; or Teddington.

Mr. *Walter*.

792. What is the heaviest amount of tonnage which now can pass down the Thames from Lechlade to Oxford?—I am not practically acquainted with that; but I know this as a fact, that a very small boat coming from Oxford to Brimscombe in the Stroud Valley was stopped about this time last year, when, I believe, it was drawing something under three feet of water. I am not practically acquainted with the actual draught. I know that it was the subject of a complaint to the Thames Conservators, and that nothing whatever has been done to remedy it.

793. You are of opinion that even for navigation purposes the upper part of the river might be greatly improved?—Quite so.

794. And that it would be desirable that it should be improved?—Yes.

Chairman.

795. Would the landowners be willing to be rated for such a purpose?—They have shown their willingness to be rated by rating themselves already in the formation of this present drainage authority, and in so far as works are proposed, which would be beneficial, I am satisfied that they would be willing to be rated.

796. For the purpose of the prevention of floods, and improving the navigation as well as the drainage?—Certainly. I should rather prefer to say for the prevention and control of floods; and I should say that their willingness would have this condition attached to it, that it should be a rating by an authority in which they had confidence.

797. I am presuming that that authority should be a distinct board from Teddington Lock, perhaps, to Long Wittenham, and another board for the upper part above Long Wittenham?—Quite so.

798. And that then the landed proprietors

Chairman—continued.

would be quite willing to be rated for the three purposes of drainage, improved navigation, and the prevention and control of floods?—I am quite sure they would be.

799. Those two bodies being, in the event of a conflict of authority, under the control of some such body as the Enclosure Commissioners or the Board of Trade?—Quite so.

800. What sized vessel can go from Lechlade to Oxford along the river?—I mentioned to the Committee that I am not personally acquainted with that; I only know that a vessel of very small draught indeed was stopped last year.

801. Do you know at all what draught it was?—I believe it was something between two and three feet; and certainly it was not a loaded vessel, it was an empty vessel.

Mr. *Walter*.

802. Do you happen to know whether any map is published, showing the internal navigation of England, giving the rivers and the canal connections between them?—I am not aware. Perhaps the Committee would pardon me for making a slight addition to the answer which I have given to your question as to the willingness of the landowners to be rated for the three purposes that you have named, that I assumed that the scheme would involve the transfer to the rating authority of a just proportion of the tolls and the revenue from the water companies, as being fairly incident to that part of the river.

803. Supposing they were rated for the purposes of navigation, they would of course require that they should receive the whole of the tolls within their district?—Quite so.

804. But how would you regulate the amount to be received from the water companies?—By distributing it between the two authorities of which I have suggested the constitution. The entire revenue from the water companies arose at the time of the transfer to the Thames Conservators of the upper river, and, as we consider, that revenue should belong to the upper river.

805. Do I understand you to say, that the whole of the revenue derived from the water companies should belong to the upper river?—We think so; at all events a fair proportion of it. That revenue had its origin, so far as the Conservators were concerned, at the time of the transfer to them of the upper river.

Mr. THOMAS ARKELL, called in; and Examined.

Mr. *Arkell*.

Chairman.

806. ARE you a native of Kempsford, a parish bounded by the Thames?—Yes.

807. Does the Thames run for five miles along that parish?—Yes.

808. Are you a Farmer?—Yes.

809. What extent of land do you occupy?—I occupy something between 500 and 600 acres in Wiltshire; not by the Thames, at present.

810. Does your land run alongside the Thames?—No, not what I occupy, but my brother's does.

811. And it is frequently flooded, I suppose?—Very much so.

812. Is the land injured, or benefited?—Benefited in some times of the year, and injured in others.

Chairman—continued.

813. Are you the owner of property as well near Lechlade?—Yes.

814. Is that property injured by the river?—Yes.

815. In what respect?—From the tailing of the flood, and from the navigation principally?—In the Lechlade district is the first, or, upper pound, about one mile in length, for the navigation at the present time. It is bayed up more than what it is higher up the stream, and that causes a stagnation at Lechlade, and injures the land that ought to be dry, and the houses as well.

816. Do you consider that the Thames Conservancy, by their operations, have been of advantage to your neighbourhood, and to the property

*Chairman—continued.*

property at Lechlade?—No, not at all; I have not heard that they have ever been there.

817. Have they carried out any works there?—Not that I am aware of.

818. Have they injured you in any respect?—The injury is from their neglect of the river; I have never heard of their attending in the neighbourhood, or calling, what I may call, a council.

819. Do you mean neglect in not clearing the weeds, or from want of dredging?—From a want of dredging, and not allowing the weeds to be cut, and not calling, if I may so term it, a council to know whether there was any injury being done from the navigation.

820. There is no navigation now on the river, is there, beyond the junction of the Thames and Severn Canal?—No, there has not been any since the Thames and Severn Canal was opened; at least so I have been informed.

821. How many years have you lived near the waterside?—Ever since I was born. I have known it all my lifetime.

822. Do you recollect the river being navigable above Lechlade?—No, only for half a mile above Lechlade, not above the mouth of the Thames and Severn Canal, which joins it about half a mile from Lechlade.

823. In your memory there has been no change as regards the navigation of the river upwards?—No.

824. You are a member of the Lechlade District Board, are you not?—I am.

825. Have you taken any steps to do any work since your formation?—We have been very anxious to commence, but we met with a little obstruction, not through the Conservancy, exactly, but we expected objections through meddling with the stream without the license of the Conservators.

826. The anxiety of your board, I believe, has not resulted in any works being carried out?—We have just commenced upon the tributary, the River Cole. We have had it surveyed and have an estimate made of the works to be accomplished.

827. Are there any other works that you contemplate in your district?—Yes, there is the cleansing of the river, and the embanking, if it could be agreed upon between the various owners; that is what has been called a flood-bank. If I were to state what I consider the best state in which the river could be put it would be an embanked river with two embankments, each drawn a short distance from the stream to take off the flood within its banks in the summer, and in winter time to keep it outside the banks for the benefit of the meadows. I contend that if the meadows are properly flooded in winter it makes the water purer, and does great benefit to the meadows. It only wants proper control to pass the floods off quickly after the rain ceases. The great obstruction now is the foul state of the river which really often upsets the great benefit from the floods. In the long floods in summer we get injury which had no occasion to happen if it was under the control of the neighbourhood, and parties interested in that way.

828. Have you ever contemplated any scheme for the storage of the flood-waters for use in summer?—No, not for storage.

829. You object to the water becoming stagnant?—Very much; we want the water passed

*Chairman—continued.*

off quickly. We like the floods in the winter, say from November till April, on the meadows, and to pass off as soon as possible after the rain ceases, and then there is no injury. That might be done without any injury to the navigation, to the drainage, or to the fishery, or either of their interests. It only wants a properly constructed scheme; what you may term to draw a line between what ought to be flood and what ought to be dry land, and the drainage of the latter to pass down to a certain distance below, regardless of parishes or anything of that kind, and then we should get the full benefit of the winter floods without the injury.

830. If you could get rid of the floods from your meadows easily after the rains had ceased, you consider that the meadows are rather improved than otherwise by the floods?—Much improved. I viewed this first pound of navigation in March, when there was no flood in the river, but the Conservancy high water mark was within a very few inches of the level of the meadows adjoining, and consequently the meadows are very much injured through the sedges and the stagnant water. Great injury has arisen really from this, about the first mile of the navigation. There is no navigation above, and it would not require so much work. There are two things that could remedy this evil, and that is either to lower the pound of water adjoining the Thames and Severn Canal, or some inside drainage or outside, whichever you might term it, to take the flood off, irrespective of the navigation. The Thames and Severn Canal comes in just half a mile above Lechlade, and there is great obstruction at St. John's Lock and Weir, half a mile below Lechlade. Something was said by a former witness of the navigation and the size of the boats along the Thames and Severn Canal. As long ago as I can remember, it was whilst the Thames and Severn navigation and the Thames itself were both in a good state, there used to be the Severn trows on the river. The bridges on the Thames and Severn Canal were principally constructed for a wider boat than other canals such as the North Wilts, and the Wilts, and Berks, which are all constructed for narrow boats, but the Thames and Severn Canal was constructed to take what are called the Severn trows (that is to say vessels suitable to navigate the Severn) and bring them through to London. That I believe Mr. Wyatt will recollect as he is an older man than I am. I can recollect their sailing up with sail, but we do not see them now; we have not seen any for years. The trade is now carried on in smaller boats.

831. Are we to understand that those Severn trows are not used now?—No, they are not used.

832. Were they of larger tonnage than the present boats?—Yes, they were of larger tonnage and wider vessels altogether.

833. What is the tonnage of the vessels now used?—I do not know, but I should think from 20 to 30 tons. I think the principal trade from Lechlade now is west, that is from Gloucester. That seems to be the limit of the coal district. I do not know whether the coal goes much further down the stream. But most of the corn that is put abroad at Lechlade goes about half a mile up the Thames into the Severn Canal, and then down to Gloucester. There is nothing of a trade towards Oxford; that seems to be what you may term the

*Mr. Arkell.*

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Mr. Arkell.

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Chairman—continued.

summit of the trade. One passes one way and the other the other.

834. Is the traffic between Gloucester and Oxford on the increase or diminishing?—I am not aware of the Oxford traffic at all. From Lechlade to Gloucester I have understood lately it has been a little increased from the high tonnage demanded by the Great Western Railway; they are driving the trade now on to the canal. The East Gloucester Railway goes round it, and you can go from Lechlade to Gloucester by rail, but that being a circuitous route and charging a higher rate, that is sending the traffic a little more on the canal than it used to be.

835. Supposing that the Drainage Commission of which you are a member, were to undertake the improvement of the navigation, would you as an owner of land object to being rated, supposing that you derived an income from the tolls?—There is so small a part of the navigation in our district that we should not trouble about the navigation. We only care about the drainage and the floods; and the little injury that is done to the navigation is of no moment. We have but about a mile of navigation on the Thames proper and the canal of course is under proper control, and there is no injury from that.

Mr. William Henry Gladstone.

836. What do you mean by injury from the navigation?—Keeping the pound of water up level with the land, and obstructing the floods going off just as quickly as they ought to do. There is a block at St. John's Bridge and at St. John's Lock, and the flood lies up a fortnight longer than it ought to do after the rain ceases, just from that state of things which might be remedied. There is no reason why any injury should be done, if it was put under proper control. The navigation could be kept up and the drainage made available, if we had the power to do it, but when you keep a block of water up level with the meadows, and there is not proper space to pass the flood off, it injures the land and it stays up much longer than it ought to do.

Chairman.

837. I gather that you would not be so desirous of diminishing the extent of the floods as of getting rid of them after the rainy weather ceases?—Yes, and controlling those floods in the summer, that is to say, either to pass them over the meadows, or, in the summer time, confine them to the banks of the stream. Then as to the benefit in the winter and the injury in the summer, it is a great hardship if you lose your crop after you have grown it. There is a great deal of hay swept away by the floods in the summer in certain seasons. My father embanked the Kempsford meadows himself, and kept the water out when other people's hay was being swept away, and that caused a little jealousy, and some one in the night came and cut the bank and let the water into our meadows as well as into our neighbours', not to benefit themselves, but that we should all share and share alike, I suppose. He embanked it at his own expense for, I should think, two or three miles, or two miles at least.

Mr. William Henry Gladstone.

838. Then you like to have the water for a certain time in winter, but not for too long?—

Mr. William Henry Gladstone—continued.

Yes, flood water. We do not want stagnant water; we want to pass it off after the flood has done the benefit. It is the natural flow of the water that does the good. If you get stagnant water, it starves the land.

839. What sort of time is required for this benefit to accrue?—As long as the flood lasts, that is, perhaps, two or three days, or a week if the rain continued, it would not hurt so that it is moving; it is the stagnant water that hurts us. Certain places, like Colonel Harcourt's, where they get the back water on some low land, are starved, whilst other land is benefited.

Chairman.

840. Would you prefer to lower the bed of the river, or to raise an embankment at some little distance on either side of the river, so as to control the floods?—I should oppose lowering the bed of the river too much where there is no navigation, because it would be more difficult to get the floods over in the winter, and by raising a moderate embankment at a little distance from the margin of the river, you keep the summer floods under control; you want to control the floods, that is to say, pass them along the river in the summer, and pass them over the meadows for the benefit of the land and the benefit of the water, and then you want the power to draw the line between the winter floods and what ought to be dry land; you want to take the drainage of the latter down to the lower level; that might be done, and there is no necessity for any injury being done to the navigation through the floods, or to the drainage, if it was under proper control, and I think that control would be best seen to by the district boards on the upper Thames.

Mr. Hall.

841. Are many of your meadows laid out in water meadows?—My own meadows are, but they are on the Coln; there is a great difference between what is called flooded meadows and water meadows; you can control the water over water meadows, you get a quantity, but you do not get quality. On flooded meadows you do not get so much quantity, but you get a better quality.

842. How do you propose to control the flood by their embankment over meadows which are not water meadows?—My father's farm was probably from two to three miles long on the banks of the river, and he commenced and embanked it up at the top. He made an embankment probably half the width of this room, from the margin of the river, not a very high bank, and continued it downwards. There were some places in the bank of the river where it was thrown down in the winter to let the flood in, but as soon as the spring commenced those places were filled up, and they kept the water in the stream, and let it out over the meadows in the winter.

843. You mean a sort of rough sluices?—Yes; sluices at different places. He brought the water in for the benefit of the meadows in the winter, and kept it out from the hay in the summer. That could be done very easily, and it is essential to be done, and I should think that no landowner would object to the expense of its being executed.

Chairman.

844. You think that the landowners would not object to those works being carried out, namely,

*Chairman—continued.*

namely, an embankment on either side of the river, the weeds cleared out, and openings made in the embankment where needful to control the floods, and that they would be willing to be rated for those objects?—I think so if it was not under arbitrary power; but I think it ought to have their consent, and that they themselves to see the plan before they would be rated, because it is quite possible to go to a great expense, and do a great deal of injury instead of benefit; that is to say, if you merely want to pass the floods off, both in winter and in summer, it would be a great expense, and you would not get any benefit; in fact, it would be a great loss.

845. Would you be satisfied with the present Drainage Commissioners as the authority?—Yes, with the Commissioners at Oxford.

*Mr. Hall.*

846. What do you mean by the Commissioners at Oxford?—The Commissioners have a vetoing power over the district boards, or they ought to have. From Cricklade to Wittenham there are five or six districts, and we are No. 2. Cricklade is the first, Lechlade is the second, and then comes Bampton, I think, and so on.

*Chairman.*

847. There are no very extensive works needful in your district No. 2?—No, not at all. There is a little extra work on this first bit of the navigation. We want to get to take it down below first or second lock, that is to say, the St. John's or Buscot Lock, which we may term the inside drainage, and to pass the flood off quick, as there is quite a block at St. John's Bridge, which is the lower end of our district.

848. I believe your opinion is that there is no reason why the Thames Conservancy should have any jurisdiction whatever over the upper river?—That is my opinion.

849. You think that you would manage your

*Chairman—continued.*

own affairs better in your own way?—Yes, much better.

850. Without any interference?—Yes, without any interference, because we have had no help from them.

851. Supposing you were a separate and distinct body from the Thames Conservancy, should any conflict arise as regards the needful works to be carried out for the navigation of the river, should you, as one of those Drainage Commissioners, object to some public authority being appealed to whose decision should be decisive in the matter?—I have not the least objection to that.

852. Do you think that you represent your brother Commissioners in that opinion?—Yes, I think so.

853. Would you have the control of the upper part of the river under one body, or would you be disposed to divide it?—My opinion is rather in favour of two bodies.

854. Where would you make the division?—At the present division, that is, from Staines to Wittenham, and from Wittenham up to Cricklade, because I think if we get too large a district we should have the same objection as there is to the present Conservancy Board; they would be so far off that the meetings would not be so convenient. People would go a few miles where they would not go a greater distance; that is my impression. It appears to me that our district, from Cricklade to Wittenham, is quite large enough for our management.

855. What is your opinion supposing that there was one jurisdiction over the whole river with two subordinate authorities, one from Staines or Teddington Lock up to Long Wittenham, and another from Long Wittenham upwards, who should be subordinate to one general authority, and the whole working together?—That would be as bad as the Conservancy; it would be just the same thing.

856. As bad or worse, perhaps?—It would be just the same thing.

*Mr. Arkell.*

8 June 1877.



*Monday, 11th June 1877.*

MEMBERS PRESENT :

Colonel Carington.  
Mr. Wm. Cartwright.  
Mr. Coope.  
Admiral Egerton.  
Mr. William Henry Gladstone.  
Mr. Hall.

Sir Trevor Lawrence.  
Mr. Charles Praed.  
Mr. Richardson-Gardner.  
Sir Charles Russell.  
Mr. Walter.

OCTAVIUS COOPE, Esq., IN THE CHAIR.

Mr. BRYAN WOOD, called in; and Examined.

*Chairman.*

Mr. Wood.  
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857. You are by profession a Land Surveyor at Chippenham?—Yes.

858. And have had considerable experience in land enclosures and in drainage works?—Yes.

859. For some years?—Yes.

860. You are acquainted with the land adjoining the Thames?—I am well acquainted with the Number 3 District.

861. Number 3 District is under the Drainage Commissioners?—Yes.

862. Just describe where Number 3 is?—Number 3 is from Lechlade to Newbridge.

863. How many miles of river does that embrace?—I could not say off-hand; I should think something under 20.

864. Your attention has been called to the management of the river by the Thames Conservancy?—Yes.

865. And are you employed by the Drainage Commissioners in managing Number 3 District?—No, I am not employed; I represent the landowners on Number 3 District, adjoining the Thames.

866. And, therefore, I suppose you have also become acquainted with the operations of the Drainage Commissioners?—Yes, I was one of the Thames Valley Commissioners under the Act.

867. But you are no longer one?—No, I am no longer one.

*Sir Trevor Lawrence.*

868. Under the Act of 1871?—Yes.

*Chairman.*

869. Are you aware of any works which the Drainage Commissioners have carried out for the improvement of that part of the world with which you are best acquainted?—No, they have done no works yet that I am aware of.

*Sir Trevor Lawrence.*

870. How long were you a member?—I was a member until the Commission ceased; from the passing of the Act until the Commission ceased.

*Sir Trevor Lawrence—continued.*

871. Which was how long ago?—About one year.

872. And was anything done in your part of the river during that time?—No, nothing was done except that a survey was made; we had no power under the first Act to do works.

*Chairman.*

873. Being acquainted with the operations of the Thames Conservancy, and also of the Drainage Commissioners, is it your opinion that the present relative positions of these two bodies should continue, or have you any suggestions to make on that head, by which landowners and others along the banks of the river in the part you have referred to would be benefited?—I should say that the control of the Thames should be in the hands of the Thames Valley Drainage Commissioners.

874. And the Drainage Commissioners?—Yes.

875. You are of opinion that the whole management of the river, including not only the drainage, but the navigation, and the exclusion of pollution, should be placed in the hands of the Thames Valley Drainage Commissioners?—As far as their jurisdiction extends along the river.

*Sir Trevor Lawrence.*

876. To where?—That would be to Long Wittenham.

877. From Long Wittenham upwards?—From Long Wittenham as far as their jurisdiction extends.

*Mr. Cartwright.*

878. From Lechlade?—Higher than that; as far as the jurisdiction of the Thames Valley Drainage Commissioners extends.

879. You propose that they should have the exclusive authority?—Yes.

*Mr. Walter.*

880. Have you any reason for thinking that Long Wittenham is the proper place for limiting their jurisdiction to, or would you extend it below

*Mr. Walter*—continued.

below that?—The reason I have for that is, that their jurisdiction extends over land adjoining the Thames to that point, and over the drainage works.

881. Is there any reason, in your opinion, that Long Wittenham should be chosen as the place to which their jurisdiction should extend?—It is a convenient division; but it would be perhaps equally convenient if it was two miles further up or down.

882. But for what purpose is it a convenient division?—Are not the interests of the landowners and others, below Long Wittenham, down to as far as Teddington, equally as important to be attended to as those above?—I dare say they are; but I mean it would be convenient because it would not be a cumbrous board. The persons in the district would be on the spot, and would be better able to attend to their business than in a larger board, I think.

883. Might not the board be enlarged so as to admit of a greater amount of jurisdiction being entrusted to them?—It might be, but I doubt if they would attend to it as well.

884. You think they are a body that are only competent to manage the river as far as Long Whittenham?—I would hardly say such a thing as that, but it would be more convenient than it would be to extend them the whole distance.

885. Then what is to become of the interests of the landowners and others below Long Whittenham?—I should form them into another board.

886. You see no reason against the multiplication of the boards?—I think it would be a great advantage to have another board.

*Chairman.*

887. Upon that point one witness has stated his opinion, that with one general body having jurisdiction over the whole Thames, with two subsidiary bodies, one from Teddington Lock up to Long Whittenham, and the other from Long Whittenham upwards, the plan might probably be found to work well. What is your opinion upon that?—It would want a controlling body.

888. With a controlling body, such as the Board of Trade or the Inclosure Commissioners?—Yes. Two boards with a controlling body, I should think, would work well.

889. You understand; a body for instance similar to the Thames Conservancy, perhaps differently constituted, being the main body with two subservient bodies attending to the drainage, and the whole controlled by some Government department?—I think the bodies who have the control of the Thames should be the bodies who act for the landowners, especially in the upper part; I do not know the lower part so well, but I should say it would apply equally to the lower part. It appears to me that there should not be two bodies, one body having the command of the Thames, and another having the control over the land; they would be antagonistic upon some points; but it should be a body that would have the whole interests under their control.

890. You understand the three things which the Committee have in view; the navigation, exclusion of pollution, and the drainage of the land?—Yes.

891. With, of course, the prevention of floods, which is the main object?—Yes; I quite understand that.

O.114.

*Chairman*—continued.

892. Then having these objects in view, what is your opinion of the suggestion which has been made, of one public body, with two subsidiary bodies, the whole under the control of some Government department, in case of conflict of opinion?—I should still say the same as I have before, that it would be better that the two bodies should have no other control but the Government control; they should have no intermediate control.

893. They should be independent of any other body save the Government department?—Yes, I think so, and I think that these objects could be carried out with equal advantages to each other. The works that would be required to control the flood and irrigate the lands, would also be available for keeping up the navigation and cleansing the river; I think I ought to add that the prevention of floods totally would be injurious to the lands, but the control of the waters, which would prevent floods when they were not required, would be beneficial.

894. You think that the flood waters might be stored in the winter or in flood time, and be made available for water supply in the summer months?—They might, but I have not considered that question; what I mean is the irrigation of the land.

895. The floods you state improve the land if they are under certain control?—Yes.

896. But in times of floods you cannot keep the manure from being washed into the river?—Yes; the floods themselves are equal to the best manure for the grass land.

897. The grass land is benefited, but perhaps at the expense of the purity of the river?—No, it improves the purity of the river.

898. How?—The passing the water over the grass land is like a filter. It improves the purity of the river, so that irrigation can be carried out with great advantage to the purity of the river. I have done it for the last 20 years, upon something like 400 acres, keeping the floods out when we did not require them, and letting them in when they were required, by which the land is greatly improved, and the water runs off quite clear.

899. Then your experience does not lead you to think that in times of flood the waters of the river become excessively turbid?—Yes, they do in the early part of the season; they are very thick then; but passing them over the land makes them clear again.

900. The floods always pass over the land when there are floods?—Yes.

901. But the effect of there being floods is, that you invariably find that the water of the river during floods is excessively turbid?—In the early part of the season.

902. In the early part of the flood?—Yes.

903. But as the flood subsides you find it gets clearer?—I mean in the early part of the season; the autumn floods are more turbid than they are in the spring of the year; sometimes they come down nearly clear in that district.

904. Are you of opinion that the works which the Conservancy have carried out have been beneficial, or injurious to the landowners, in the district that you are connected with?—They have been injurious to the land which I am connected with.

905. In what way?—They have prevented our having the control of the water, and they have prevented

*Mr. Wood.*

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Mr. Wood.

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1877.*Chairman—continued.*

prevented the irrigation on the land on the side of the river which was embanked, at times when it required irrigation. In fact I remonstrated with the secretary at the time he took away the Tadpole Weir and another weir.

906. And what was the reply you received?—Well, I do not know that I received any reply, but I have since written to Captain Burstall; I got no redress at any rate.

907. You got no redress, and you are doubtful whether you get any reply?—At first I did not get any reply.

908. The removal of those weirs has lowered the flow of the river in the summer?—In the summer.

909. Thereby preventing your meadows from being irrigated as it was intended they should be?—And in the spring, in fact, we cannot irrigate the land well, without a flood or a weir being in, and the works were done at a considerable expense to enable us to irrigate.

910. By lowering the bed of the river, do you consider that the weeds have increased or diminished?—The weeds have increased. In the dry summers the mud is hardened, and the weeds have increased, and it is not so good a river as it was.

911. And you can trace pecuniary loss to the landowners, from the action of the Thames Conservancy in your district?—There is no doubt we lost two crops of grass.

*Sir Trevor Lawrence.*

912. That was not owing to the water in the river being particularly low, in certain years?—No, it was owing to not having the power to irrigate the meadows; to stop the water back by Tadpole Weir. The works were done in the expectation that Tadpole Weir would always remain as it was.

*Chairman.*

913. As far as your experience goes, do the Thames Conservancy use due diligence in getting rid of these weeds when they grow?—The river has been very full of weeds, and I am informed that they do not cut them, or allow any one to cut them; that is so far as my information goes.

914. Then, if the water were penned above the high-water marks which are fixed, I believe, on all weirs, could the owners of the adjoining land avail themselves of that extra height of water, by removing the boards, and letting the water on to their land?—They could formerly, but now the high-water marks are removed.

915. Who removed the high-water marks?—It was done by order of the Conservators.

916. Is there any case where the water has been over-penned?—Yes, at Rushy Weir the water was over-penned, and I wrote to Captain Burstall on the subject.

917. What was his reply to that?—He replied that he would attend to it.

918. What has been the action of the Board in consequence?—I do not know; we have no means of ascertaining the exact high-water mark there now. Formerly, if the water were penned above high-water mark, we could go to the magistrates and get the tenant of the weir fined.

919. Suppose there was either one body with two subservient bodies, or suppose there were two or three bodies, independent of each other,

*Chairman—continued.*

in the case of conflict of authority, who, do you think, would be the proper controlling authority?—I should say the Inclosure Commissioners would be.

920. In preference to the Board of Trade or the Local Government Board?—I think they would, because they have to deal with questions of land entirely, and they are best qualified, I should think, to do so.

921. Do you consider the present district, managed by the Drainage Commissioners, large enough?—I think so.

922. Or too large?—No, I think it can be worked very well as it is.

923. Divided into districts?—Divided into districts.

924. I thought you said you would have another Board at the end of your jurisdiction, from Long Whittenham down to Teddington Lock?—I should say that would be the best management.

925. And, according to your views, would those two bodies undertake all these objects you have in view?—I should say so.

926. Doing away with the Thames Conservancy; you would abolish the Thames Conservancy?—All over that portion.

927. All above Teddington Lock?—Yes.

928. And then you would have two bodies, one from Teddington Lock to Long Whittenham, and the other from Long Whittenham upwards; those two bodies being under the control of the Inclosure Commissioners?—Yes.

929. Have you every reason to think that, with such arrangements, all the objections we have in view could be carried out?—I should say so, better than by any other arrangement, because the interest of the landowners would be identical with purifying the water and the navigation.

*Sir Trevor Lawrence.*

930. What was the object of the removal of this weir which you speak to?—I do not know except to allow the flood water to get away more freely.

931. Has any other weir been removed?—Yes.

932. If they were all replaced, would there not be a danger that the floods would be increased again?—I think, if they were put up properly, and the sills made deeper and wider, it would be better for the river. If they were all removed, it would have very little practical effect on the floods when they occur. It is not sufficient space gained to have much practical effect on a large flood. I believe the only way of effectually controlling floods is by embankments on each side of the river. I have known that effectual, and it is very cheap.

*Mr. Walter.*

933. How many years have you been an occupier of land along the banks of the river?—I have managed land for about 24 years.

934. And have you found, on the whole, that the action of the Conservancy Board has been injurious to the property?—So far as I know.

935. Can you state, from your own knowledge, in what respect it has benefited or injured the navigation?—The navigation, perhaps, might be rather improved by their putting in a lock at Rushy, but I think the navigation is injured by

*Mr. Walier*—continued.

by taking away the weirs, because the boats do not get the same flush of water to carry them up and down as they did when the weirs existed.

*Sir Trevor Lawrence.*

936. You say it has been injurious to the interests of the landowners; does the land let for less?—No.

937. It lets for more, perhaps?—No, I do not think it has made any difference, but if we could have continued improving the meadows by irrigation, the land would have let for more; the irrigation would have increased the value of the land considerably if it could have been carried out, that is if the occupiers had the power to irrigate.

938. You do not think there is any conflict of interest between the landowners, on the one side, with respect to irrigation and such like matters, and the general river pollution having regard to the damage by the floods?—No, I think not.

939. The same measure which would benefit one would benefit the other, you think?—It would certainly, because the control of the floods would enable the landowners to put as much water as would do good, and not do harm, over the land, and would entirely prevent the floods when they were not required in summer times when they do most damage, and the extra height and velocity of the water when confined by embankments would tend to scour out the river, and to keep up the weirs, would be an advantage to the navigation.

940. Is the water of the Thames so thick that after it has gone over the meadows the cattle will not eat the grass, for a time?—It generally happens to be thick when there is not much grass on the land; but, if we had summer floods, it would be prejudicial to the feeding of the cattle. If it happened this time of the year, it would be a very great loss indeed. I could give an instance. When I embanked one side of the river, and the other side was not embanked; we made hay on the one side which was embanked, when the other side was under water, and that hay sold for 4 *l.* 10 *s.* a ton on the one side, and the hay on the other side at about 25 *s.*

941. Did you ever have the hay carried away by the summer floods?—Yes; before the embankment it used to sweep over the meadows.

942. And now it is kept out by the embankment you have put up since you have been connected with that part?—Yes; a year before the embankment was put up some parts of the meadows were under water for nine months, and in May there was not a vestige of grass for 100 acres together. There was not a sign of a blade of grass, owing to the floods. I was down there this May, and the crop was looking very flourishing.

943. Have there not been very severe floods this year?—Yes, very severe floods.

944. That is the result of the embankment?—It is the embankment which controlled the floods in that part, and on the opposite side, too.

*Mr. Praed.*

945. Where is this embankment which you speak of?—The embankment on one side is a little below the road which crosses the Radcot Bridge-road, and extends nearly to Ducksford, in fact.

O.114.

*Sir Trevor Lawrence.*

946. Who made these embankments?—I made them.

947. Was that paid for by your employers?—It was done under the Inclosure Commissioners. It was part of the expenses of the inclosure.

*Colonel Carington.*

948. You say the floods do the land good?—Yes.

949. And if the floods were prevented, would the value of grass land decrease?—Yes, grass land would, undoubtedly.

*Mr. Praed.*

950. What was about the cost per mile of that embankment which you speak of?—At that time it cost about 60 *l.* or 70 *l.* a mile.

*Mr. Cartwright.*

951. For how many miles?—Six miles on one side, and two miles on the other.

*Mr. Hall.*

952. What is the nature of the soil?—The soil was clay in some parts, and in some it was more peaty.

953. Have you ever known, in your experience, the flood out on the other side of the embankment, before the river had left her bed completely; in the adjoining meadows, for example, have you ever known the flood out while the river was still in her bed?—I understood this question referred to the river before the embankments were made. The answer should be, "I have known the flood out in the adjoining meadows before the river overflowed its natural banks, the adjoining meadows being lower than the river bank."

*Mr. Richardson-Gardner.*

954. Do I understand you to say that the land was improved by the floods of the Thames, and yet that you would bank them out?—Yes, to get a control over them. The lands are improved if the water is put over them when it is wanted, but are injured if it comes there when it is not wanted.

955. Then, with your embankments, you can flood it, or not?—Yes.

956. You say you embanked on one side; what is the opposite side; is it land, or a town?—Land.

957. Then do you not send the floods over there by your embankment?—If it were not embanked, both sides, it would tend to throw them over to the other.

958. Do I understand that the landowners do not object to these floods; that is, they do not believe that they injure them at all?—They injure them if not controlled; the uncontrolled floods injure them. If a flood were to happen now, in the mowing grass, of course it would all go; I was just now illustrating that by saying that on one side where the river was embanked, we made hay, while the other was under water, and the tenant sold that hay at 4 *l.* 10 *s.* a ton, but on the other side the hay which was left sold for 1 *l.* 5 *s.*

959. Then the floods, if under management and control, are not disadvantageous to the land? They are the finest things which we can have.

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960. How

*Mr. Wood.*

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Mr. Wood.

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Colonel Carington.

960. How long then is the best period that they should be on the land?—They want to be on the lands when they can pass over them rapidly; we want a good head of water, to pass the floods over rapidly, about three or four days at a time.

Mr. Richardson-Gardner.

961. You have not spoken about the rivers in towns at all?—No.

962. You do not wish to give any evidence upon that subject; it is simply with regard to the land that you speak?—With regard to the land.

Mr. Walter.

963. Do you require any powers to embank, or is it perfectly optional?—The powers under which we embanked were under the Inclosure Acts; we had full powers under the Inclosure Acts, and we not only embanked, but stopped some streams which ran from the Thames, and banked them out as well.

Sir Trevor Lawrence.

964. And you paid for it by rate?—By rate.

965. Is there any feeling in your neighbourhood against carrying on works by means of rates; would there be any opposition to rating?—I think not. I am almost sure they would not oppose it, as long as they were satisfied that the works would be to their advantage.

Mr. Hall.

966. What sort of rate per acre would you require for the purposes of this embankment?—The rate for the embankment itself would be a very small rate because, even considering that the price of labour has very much risen since the time I did it, it would be more costly perhaps, but even doubling it, it would come to very little per acre.

967. You say the cost is 60*l.* per mile?—*£*. 60 or 70*l.* per mile; and now, supposing it were to be 120*l.* per mile, it would not be so very much.

Mr. Cartwright.

968. How long is it since your embankment was made?—The first embankment was made about 25 years ago.

969. Who put up these weirs which you speak of as having been removed?—They had been put up from time immemorial, I should say.

970. I think you said that money had been expended upon some of them by the landowners?—By the Conservators lately, but the owners of the weirs used to keep them up before the Conservators had the control.

971. When did the Conservators remove them?—I think it must be six or seven years ago, speaking from recollection.

972. Did they give no notice before removing them?—Not that I am aware of; not with regard to the one I spoke of. They gave notices where it was a question of compensation, I believe.

973. The one that you spoke of was the Tadpole Weir?—Yes.

974. No compensation was given there?—No compensation.

975. And no notice was given to the parties interested?—I cannot say of my own knowledge that there was no notice given, because I did

Mr. Cartwright—continued.

not represent the owner, but the agent of the opposite landowner was equally anxious with me not to have the weir removed.

976. You give it as your opinion that the removal of that weir did injury to the parties who were owners of the adjoining land?—Yes; we should be glad to pay to have it put up again.

977. Do you mean your employer, or the estate that you represent?—The estate that I represent, and the estate opposite.

978. Do you consider that the estate has suffered by the removal of that weir?—Yes.

979. I think you said that injury had been done to the land by the floods, and that you had lost crops?—By want of the water.

980. That is a solitary instance, is it?—That would occur in dry seasons.

981. Do you give any estimate of any money loss which has occurred on the properties with which you are acquainted, in consequence of the floods?—We estimated that we lost a crop of hay over 400 acres, which, put at only 1*l.* an acre, or 2*l.* a ton, would be 800*l.* I wrote to Captain Burstall at the time, and the tenant and myself estimated that we had lost more than 1,000*l.* in value of the crop; that is to say, that if we had had the control of the water, the crops would have been worth over 1,000*l.* more than they were.

982. When was that?—That was, I think, in 1870; it was a very dry summer.

983. What was the reply which you received?—The reply was, that no compensation would be granted; I forget the exact reply.

984. Did you send in a claim for compensation?—I wrote, claiming compensation, and stating a sum, but I have not the correspondence with me.

Mr. Walter.

985. In a very dry season is there always water enough to provide irrigation for you, supposing the Conservators would let it alone?—Yes, we should have plenty of water at the time we wanted it, but it would have been earlier than this time.

986. What time of the year was it that you wanted it?—It would be wanted in May, and March, and April in a very dry season.

987. March, April, and May 1870?—Yes.

988. Was there enough rain in those months to furnish sufficient water?—No, it was very dry indeed, we had no crop.

989. But in those months was there sufficient rain to have furnished a supply of water?—There would have been sufficient water in the river at that time, but there was not sufficient rain for the land.

990. Supposing there was not sufficient rain, could the water have been spared for irrigation purposes?—Yes.

991. You are sure of that?—Yes, because the navigation is so small there, that it would not have affected it.

Mr. Cartwright.

992. Were these high-water marks which you spoke of, removed without any ground being assigned for their removal?—Not that I know of; they were fixed on the weir, and when the weir was removed they were naturally removed; they were iron marks fixed on the sides of the weir.

Mr. ROBERT CASTLE, called in; and Examined.

*Chairman.*

993. Do you reside at Oxford?—I do.

994. And what is your profession and occupation?—I am a Land Agent and Surveyor.

995. And you have had some years experience of the land adjoining the river?—Yes, I have known it for 25 years.

996. Are you connected in any way with the Thames Valley Drainage Commission?—In no way whatever.

997. Are you aware of any works being carried out by that Commission?—Nothing more than the survey they have made.

998. Have the operations of the Thames Conservancy come under your notice?—No, more than my knowledge of their having removed one or two weirs on the river and repaired the locks.

999. Have they benefited or injured the lands adjoining the river by their operations?—I do not think they have benefited them in the least; the river is steadily growing worse as far as my experience goes.

1000. In what respect?—As a means of arterial drainage.

1001. How has the river been altered so as to injuriously affect the land?—It is growing up in many places with weeds and mud-banks, which are not removed as they ought to be, and it has been adapted for navigation purposes to the injury of its use as a drainage means.

1002. You say the state of the river has been injured as far as the arterial drainage is concerned; but the bed of the river has been lowered, has it not?—Only in patches; in some places the bed of the river has been lowered, but not as a general thing.

1003. Do the weeds in the river grow to the extent that they at all interfere with the navigation as well as with the irrigation?—Quite in the upper parts they do, but not so much in the lower parts.

1004. Then, upon your showing, the Thames Conservancy not only injure the land, but allow impediments to the navigation to grow up in the river?—In parts, and a great deal of mischief arises on the branch streams, or tributaries, which the Conservancy does nothing whatever for.

1005. Then they are not responsible, one way or the other, for that?—No, they are not responsible for the tributaries; but my view is that some means ought to be adopted for dealing with them.

1006. So that the tributaries should come under some authority?—Undoubtedly.

1007. What authority would you suggest?—The Thames Valley Drainage Commissioners; so far as I know, there has been no means of testing what their work will be; but so far as the organisation goes, it seems to me a very good means of dealing with the river and its branches.

1008. As a land agent, are you enabled to state from the action of the Drainage Commissioners that any injury has been done, or any benefit has been done to the land at present?—They have done nothing at present.

1009. But you think, with enlarged powers, they would be beneficial to the land?—I do.

1010. Would you extend their powers over the tributaries?—Yes.

1011. And would you give them the entire

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*Chairman—continued.*

control?—I do not think it would be possible to deal with the matter effectually if there is a divided body—a divided jurisdiction.

1012. Would you have one body of Drainage Commissioners extending over the whole river, or if not, where would you divide it?—I think that the objects of the controlling body above the tide way would be identical, and therefore, in theory, one would say that one board would be the best; but it is quite likely that the practical working of one body would not be so good as two.

1013. Where would you divide it into two; above the tidal influence?—I should divide it at some point very nearly below the junction with the River Thame, between Wallingford and Dorchester.

1014. Is that near Long Wittenham?—It is below Long Wittenham. If the district is divided at Long Wittenham you would leave out the River Thame, which is an important tributary, and which, I think, ought to be under the control of the upper board.

*Mr. Cartwright.*

1015. It is not now?—It is not now. The River Thame is entirely omitted, and also a great portion of the River Cherwell.

1016. I suppose you attach great importance to the Cherwell?—Yes.

*Chairman.*

1017. Then you suggest two independent bodies, one from Teddington up to the point you named, somewhere below Long Wittenham and the other above?—Yes, for the whole of the river and branches above.

1018. And the Thames Conservancy is to have control of the river from Teddington downwards?—Yes.

1019. In the event of a conflict of authority occurring between these three bodies, with a due regard to the navigation, the prevention of floods, and the exclusion of pollution, how would you meet that?—By having some board of reference.

1020. What board of reference would you suggest?—I should undoubtedly suggest the Inclosure Commissioners.

1021. And under such an arrangement you do not apprehend any confusion in the jurisdiction in the river being divided between three bodies, subject to one Government department, as a Court of Appeal?—I do not see any reason to suppose there would be any difficulty in working such an arrangement.

1022. And by such an arrangement, do you think that the system of arterial drainage might be very much improved to what it is at present?—Very much.

1023. To the great advantage of the land?—To the great advantage of the land.

1024. Suppose a body, such as the Thames Conservancy, were constituted, with a due admixture of landed proprietors and local authorities added to it, which should have the control of the river in every respect, with two subservient bodies who should be Drainage Commissioners, but acting under them, the whole being subject to the control of the Inclosure Commissioners,

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in your opinion, would such an arrangement work?—I do not think it would work so well as the arrangement I have suggested before.

1025. Would you prefer three independent bodies?—Very much.

1026. All acting harmoniously together?—I see no reason at all why they should not act harmoniously,

1027. Are you aware that the Drainage Commissioners and the Thames Conservancy do not act in exactly strict harmony at present?—I am given to understand so; but I think that arises from their having a joint jurisdiction over the same portion of the stream. That is the very reason I should put forward as a strong one for separating them, and keeping the river entirely under the control of the one body, dealing with it at any particular spot.

*Sir Trevor Lawrence.*

1028. Might there not be some danger that the authorities having the control over the lower part of the river, would put the blame of the floods occurring on the bad arrangements, and inefficient management of the upper part?—I do not think there would be any danger with an appeal to the Inclosure Commissioners, who are specially acquainted with works of this kind. I think the works executed by either of the separate boards should be approved by the Inclosure Commissioners.

1029. Why should not the whole of the upper part of the river be placed in the hands of one body, or do you think it is too large?—I think it is too large. My first feeling was in favour of one board, but from what I have seen, I think the difficulty of working with one board for the whole district would be very much more than working with two boards. One reason is that the river changes its character very much. At the point I have suggested for dividing the jurisdiction it enters the chalk district, and as we know flows through very much narrower valleys, and the number of towns and villages on its banks is very much larger; it seems therefore to me to be the natural point at which to divide the jurisdiction.

*Chairman.*

1030. Do you consider that the mills affect the flooding of the river?—I do think that they do so now, and I think it is very important that the board should have control over the mills.

1031. The only control they could get over them would be by purchasing their water rights?—No doubt they would have to compensate them if they injured their water rights, but I think they ought to have the power to do it; I think that is quite essential.

1032. And to carry out all these works, and to give compensation to the millowners, as far as your experience goes, do you think the landowners would be willing to be rated for the purpose?—If it was done distinctly for the benefit of the land I think there would be no difficulty about it.

1033. But you are going to have a board that shall not only consider the land, but the navigation, exclusion of pollution, and prevention of floods?—Yes, but I think the drainage is the first interest, and I think the river should be looked upon first as a means of drainage.

*Chairman—continued.*

1034. You have been kind enough to inform the Committee of your opinion that there should be three independent bodies having jurisdiction over the river?—Yes, but not at the same part of the river.

1035. In different parts, but three independent bodies, who shall have the entire control over their respective parts?—Yes.

1036. They would have to control the floods, they would have to exclude the pollution, they would have to keep up the navigation, and they would have to attend to the arterial drainage of the land?—Yes.

1037. With these bodies in view, would the landowners, as far as your experience goes, be willing to be rated for their fair share?—Yes, undoubtedly.

1038. Of course receiving the tolls for the navigation and other sources of income?—Yes, exactly.

1039. They would be willing under those circumstances to be rated?—So far as my experience goes there would not be the least objection. I may say I have had to deal in a number of cases with compensation to tenants for damage done them by the water in the present state of the river, and we have had to allow the cost of re-sowing meadows, and have had to make abatements of rent in a number of cases in the last two years.

1040. You are of opinion that for purposes of arterial drainage the river is decidedly worse than it was, and is growing worse?—Yes, certainly; I judge by the effect upon lands with which I have to deal; they are injured more now, and have been the last few years, than they were formerly.

1041. Are you acquainted with the upper part of the River Cherwell?—I am acquainted with the whole of it from its junction.

1042. Have you watched it lately?—Yes.

1043. What can you tell the Committee upon that point?—That the upper part of the Cherwell has got very much worse.

1044. In what respect?—The river is almost grown up in places.

1045. With weeds?—With weeds and mud, and after about three days rain the meadows are under water; it has been the case this last May, and very great damage has been done, the present grass crop has been nearly spoilt on a very great deal of land.

1046. Owing to the filling up of the bed of the river?—To the insufficiency of the river to carry off the water.

1047. As a land agent, have you in any cases advised a reduction of rent, or an allowance to tenants in consequence of the floods?—In numbers of cases I am sorry to say.

1048. And would the tenants be pleased to see such a drainage board as you have pointed out as desirable?—I can only say that I have had a number of them call upon me repeatedly, and urge me to get a board formed under any of the public Acts, in order to enable them to deal with the River Cherwell as a whole. They have been to me, and asked me to get a meeting up, and said they would willingly pay for any necessary works in order to get the river improved.

1049. Have

Mr. Walter.

1049. Have you had complaints at the same time from any of the occupiers under your management of a deficiency of water, as well as of floods?—Occasionally, just in the driest part of the summer I have had complaints.

1050. Was that attributed to the mismanagement of the river, or to insurmountable natural causes?—It has been considered that it has been principally from the fault of the river not being properly taken care of; of course you could not entirely remedy an injury of that kind, because it is from causes over which nobody would have entire control, but it might be very much amended I think.

1051. Have you had any demand for compensation upon that score?—Not upon that score.

1052. Do you concur with the last witness in saying that the floods, when properly regulated, are beneficial to land?—Yes, undoubtedly.

Sir Trevor Lawrence.

1053. One witness has given us evidence that the raising of the head at Sandford Weir has considerably increased the floods about Oxford. Are you of that opinion?—I have not the least doubt that the height of the weir there does cause a great deal of flooding about Oxford, but I have no recollection of that having been raised, and have no personal knowledge of it. I am quite certain that that weir and the one at Ifley causes a great deal of the flood around Oxford. I live at a place very near the bank of the river where I can see the effect of the floods very easily, and I have watched them with a great deal of interest, and on Sundays, when the Ifley mill is not at work, I have noticed that the floods rise very rapidly.

1054. If those two lock heads were lowered, do you think it would have a material effect on the floods about Oxford?—Yes, a most desirable effect.

1055. Are there any other measures except clearing out these mud-banks, weeds, and general conservancy measures, which you recommend to meet the floods?—I have not considered the matter enough to offer any engineering opinion about it, but my own experience is that some additional works will be necessary. I do not think that merely clearing the stream, and dealing with the river as it now is, would be sufficient to let the flood water off as rapidly as it ought to go. I think you might want to cut some straight channels in places to give an additional water-way.

1056. One of the witnesses had suggested cutting across that loop, from Bridge's Weir to Abingdon; that would be, of course, a considerable operation?—I should not like to give an opinion about that; it is a purely engineering question, but I know the district well, and I think that some works of that kind will be found necessary if the floods are to be abated as much as it is desirable they should be.

1057. In the land under your management, is the hay ever carried away by the summer floods?—Oh, repeatedly. I have known a whole crop carried off at times. A tenant of ours, on the Cherwell, came to me last year for compensation, and said he had had 500 l. worth of hay washed away.

1058. Are you acquainted with the Port Meadow?—Quite well.

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Sir Trevor Lawrence—continued.

1059. What acreage is it?—Nearly 400 acres, I believe, but not quite. I do not know the exact measurement of it.

1060. What is the effect of the floods upon that?—Well, it has been under water for a great portion of the last two years.

1061. Completely under water?—Almost entirely. The Port Meadow is highest along the bank of the river. It is situate immediately above Oxford. It is not shown distinctly on the map you have here, but the position of the meadow is this: supposing the river to run here (*describing*), it is tilted a little in that way, and this is the lowest corner. Therefore very often there is a rim of land just at the outside, which is not under water, but the south-east corner of the meadow is very often under water, as much, I think, as from six to eight months out of the 12, in a wet season.

1062. Would any moderate amount of embankment keep that water out?—No; it would help it probably, but I do not think embanking alone would keep it out. A good many of the meadows on the bank of the Thames have a coarse gravel subsoil, and the water rises up from below in many cases that I know.

Mr. Walter.

1063. There is a large fleet of sailing boats generally kept there, is there not?—Yes; I have been across that meadow in a boat scores of times.

Sir Trevor Lawrence.

1064. You said that the floods last month damaged the grass; I suppose, ordinarily speaking, a flood in May does not do injury, does it?—Well, I would very much rather not have it in May; I think that is a time when you get great injury, especially to meadows which have been shut up to be mown; you get a lot of grit in, and the grass is destroyed. I may mention that in some of the meadows I have the management of the grass has been destroyed, and we have had to re-sow them twice in the last two years, and there is scarcely a blade of grass on them now.

1065. But grass will survive a great deal of covering with water, will it not?—Yes, but the period of submergence has been too long; last year we had the water on for months and months. We had lots of lands on which the water was for 12 weeks continuously, and it quite rotted the grass; so much so that we had to allow the tenants seed to re-sow it, and had to abate their rent also.

Admiral Egerton.

1066. You said something about the board controlling the contributories of the Thames; would there not be some difficulty in defining what a tributary of the Thames is?—I should define it as comprising all the streams which flow into the Thames.

1067. How would you define their limits; they are reduced to mere threads of water at some points?—Yes, but on the upper portion of the stream, so little would have to be done that I do not think the payment would amount to enough to make the landlords object to it.

1068. But is there not danger of conflicting with private rights on these smaller streams?—I am distinctly of opinion that the private rights ought

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ought to be subservient, as far as the main drainage goes, to the public rights.

1069. But the owners might take a different view?—I do not think the owners would suffer anything, or object to reasonable control of their rights.

1070. You do not think there would be any practical difficulty in ascertaining them?—Not at all.

Mr. *W. H. Gladstone*.

1071. Do you think a local body, with full powers, would be able to protect itself from the injury you have described from the River Cherwell?—I do not think so, and that is why I have advised these men not to form a local drainage scheme; I do not think that a local body can do it. It ought to be under the control of the body that deals with the matter generally; because the outfall of the Cherwell is into the Thames, and the great thing to do will be to improve the outfall into the Thames. The Cherwell water is often dammed back, by not being able to get into the Thames below.

1072. Do you think that if the Thames were well regulated the Cherwell would be regulated also, so as to deal with that?—No, it must be still regulated of itself.

1073. How would you deal with it?—There must be power given to clear the streams; rating the landowners and occupiers for the expenses.

1074. Then, as I understand, you do not think you could prevent the damage?—You could not entirely prevent the floods, but they do not do much damage if you can keep them off at certain seasons of the year, and get them off quickly when they do come.

1075. But you say they were on the land for 12 weeks, and you could not stop them?—I think you might manage it so that the period of flood would be, at the worst, reduced to 12 days, instead of 12 weeks, if the river were properly cleansed.

1076. You do not contemplate embanking?—I should contemplate it as a part of the scheme, but I do not think embanking alone would remedy the evil. I would use it where it suggested itself as a proper thing to do.

1077. Which part of the Cherwell is it which you spoke of as being so much choked up?—The whole of the Cherwell is in a very bad state, but the portion between Hayford and Banbury, I think, is the worst.

Mr. *Hall*.

1078. And that is a portion over which the Drainage Commissioners have no authority, is it not?—No authority; the worst portion has been left out of their scheme.

1079. Do you allude to that portion only, or to the whole of the stream between Steeple Aston and Oxford?—The whole of the stream.

1080. And it is because you think these tributaries so important for getting away the water, that you rather advocate that the same authority should have power over the main stream, and also over the tributaries?—It is for that purpose.

1081. You say also that the Thames has been getting steadily worse, and you lay the blame of that at the door of the Thames Conservancy?—No, I would not blame them altogether; I think they might have done something to prevent it,

Mr. *Hall*—continued.

but I do not think they have done anything to cause it. It is a case of negligence.

1082. Then the authority which you desire to substitute for them have, apparently, neglected the rivers over which they had jurisdiction, the Cherwell for instance?—The body that I would substitute for them has really never been at work; it was only elected last year.

1083. The Drainage Commissioners have had no time to do anything with the Cherwell?—No, they certainly have not; they were only elected last year.

1084. When you say you think extra work would be necessary, had you in your mind the abolition of weirs; do you consider the Thames Conservancy have been wise in that matter?—I do not think they were wise in that matter. I should not abolish the weirs. It is very important to keep the river up to a certain high level in the summer months.

1085. You have the irrigation of the land in view?—Partly.

1086. And embanking you said you do not attach much importance to?—I do not think you could remedy the evil by embankment entirely. I think it is a very important means of helping to deal with the stream, but not sufficient in itself. Simply embanking the river upon each side would not remedy the evil which we complain of.

1087. It would practically prevent floods going beyond a certain distance, would it not?—No, I do not think it would.

1088. Because of the water rising from behind the embankment?—Yes.

1089. And the cost of embanking is a very important element, is it not?—Yes, it is a very serious item.

1090. Have you made any calculation at all as to the rating?—No, I have not.

1091. One witness told us the expense would be about 60 *l.* a mile?—I was rather surprised to hear him say so, but then he was speaking of a number of years ago; I do not think he would say 60 *l.* a mile would do it now; I should say that any kind of embankment you could put now would certainly exceed 100 *l.* per mile.

1092. That would involve an enormous rate?—If it was done all over the river it would.

1093. Practically, a doubling of the rental, would it not?—Perhaps not a doubling, but a very serious addition to the rental, and I do not think it necessary either.

Mr. *Praed*.

1094. Do you attribute the bad state that the Cherwell has got into lately to the action of the mills at all?—Yes, very much.

1095. To keeping the water up too high?—Yes.

1096. Have you any idea how many mills there are on the Cherwell?—I could hardly answer that question off-hand; I think I know every one of them; but I should have to count them along. I should say, roughly speaking, there may be about 20 between Oxford and Banbury.

1097. And those are rented at an average of 100 *l.* a mill, I suppose?—I should think that was quite as much as the mills alone would be rented at, taking them all through; as some of them are small.

1098. That



*Mr. Praed*—continued.

1098. That would be about the average?—That would be about the average.

1099. You would have to take down the mills?—I do not think they would require to be taken down. You would want to improve the overflow from them, and the means of letting the water off in the winter, and perhaps to lower the sills of the mills; but they need not be destroyed.

*Colonel Carington*.

1100. Are the locks and weirs, in your opinion, in such a state as to assist the running off of water?—Certainly not; I think they are very insufficient for the purpose.

1101. You think something might be done to render them more efficient?—Yes, I think that is a very pressing want indeed.

1102. Who has the looking after them?—Now

*Colonel Carington*—continued.

the Thames Conservancy would have the control of those on the Thames.

*Mr. Richardson-Gardner*.

1103-4. Have you any practical experience of embankments?—I am acquainted with the embanking that has been done on the Thames for the last 20 years; I am agent for a good deal of land which was embanked by Mr. Bryan Wood and Mr. Ripley.

1105. Then, do you know of any particular embankment which, if the soil upon which it is constructed be gravel soil, is of any use?—It is of some use, but it is by no means enough to keep the land behind it from being flooded.

1106. The water percolates through the soil, and rises behind the embankment?—Undoubtedly.

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*Mr. BRYAN WOOD*, re-called; and further Examined.

*Chairman*.

1107. UPON the point of the embankment which you told the Committee you made, did that exclude the water behind thoroughly?—Yes.

1108. You had no experience of the water percolating through the subsoil, and getting to the back of it?—No, not on the surface; but I should say there were interior watercourses, which took off the water. To make the embankment perfectly advantageous to the land, it wants an interior drainage as well; the embankment would allow of the interior drainage in the land that I spoke of, and the water has not percolated through the land, although it is gravel subsoil.

*Mr. Richardson-Gardner*.

1109. You say the subsoil is gravel?—Yes.

1110. And yet you say that when the floods came, they did not percolate through the soil within the embankment?—Not to rise on the surface.

1111. And yet it is a gravel subsoil?—Yes, but I should say it is all underdrained as well; but before it was underdrained, it did not rise to the surface.

1112. You know how the water percolates and rises even before it overflows its banks?—Yes, I know cases where it has been so.

1113. Yours was a gravel subsoil, and yet it did not do so?—No, it does not do so; but the reason why it does not is that there is interior drainage. There are watercourses cut inside the embankment to carry off the water which would otherwise, perhaps, have flooded the land. Of course, if there were a gravel subsoil, and there were no interior exit for the water, in the course of time it must come to the surface.

1114. Do I understand you to say that immediately within the embankment you have a system of drainage to take off the water which would otherwise percolate and come through?—Yes, the principal watercourse is half a mile, or more, from the embankment.

*Mr. Hall*.

1115. Then, where do you get your fall?—The fall is lower down the river; there is a bend in the river; it is like cutting across the short end of a horse-shoe.

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*Mr. Hall*—continued.

1116. Then that may be called a local exception?—It is applicable to a great deal of land in the upper district; the land in the upper district is adapted for that, because the land drains away from the river.

1117. I understood you, in reply to me, to say that when you were making this embankment there was a great deal of clay?—So there is.

1118. How deep is that clay?—The clay is near the river, and then underneath that is gravel.

1119. How far down is the gravel?—The gravel ranges from three to six feet deep, below the general surface of the land.

1120. Then in a case where gravel came almost to the surface, the embankment would be practically useless, because the water would well up?—No, I think not; I know of cases where the gravel is very close to the embankment, the embankment is partly made with gravel.

1121. And yet it is a good embankment?—Yes; it is as good an embankment there as anywhere.

1122. But where there is no interior system of drainage, how is it?—There is an interior drain all along, on both sides of the river, where I made the embankment, and that carries off any water which could percolate through.

1123. Do you know of any case where the gravel comes near the surface and there is an embankment placed there, without any interior drainage, from the bend of the river being so placed as to make it possible, and yet the water does not rise inside the embankment?—The water would rise under those circumstances; it is bound to.

*Admiral Egerton*.

1124. Will you give us a description of the weirs, which you say were removed, above Oxford, the more important ones, what height they were, and built of what material?—They were ancient weirs, roughly made, a beam running across on the top and a sill at the bottom, with fixed upright posts between sill and beam; and when they wanted to stop the water, boards (fastened to poles) fitting the openings between the upright posts, were lowered to the sill.

1125. They were entirely constructed of wood?—Entirely of wood.

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1126. And

*Mr. Wood*.

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Admiral Egerton—continued.

1126. And I think you said they were of a very ancient construction?—Yes.

1127. I suppose they had been repaired at intervals?—They had been repaired and renewed no doubt, many times.

1128. By the Thames Conservators, or private individuals?—By private individuals.

1129. Were they the property of individuals?—They were.

1130. But they were so ancient that there were no title-deeds concerning them, I suppose?—I expect they passed with the estate. Of course they belonged to the owners of the adjoining

Admiral Egerton—continued.

estate, but in some cases the land immediately adjoining did not belong to them; I know, in the case of Winnie Wegg's Weir, that is so.

1131. What height were they to keep the water back?—The boards were put in so as to stand 2 or 3 feet or 3 or 4 feet above the sill to pen the water as required for fishing or navigation; I took the heights of them all at the time I made the embankments that were near, and I think the sills were about 4 feet 6 inches under the high-water mark, as far as I recollect.

1132. They were not considerable engineering works?—No; they were very rough works.

Mr. W. D. MACKENZIE, called in; and Examined.

Chairman.

Mr.  
Mackenzie.

1133. YOU are a considerable owner of land, I believe, in the neighbourhood of Henley?—My father is.

1134. Does your father's property extend along the river?—About a mile, or a mile and a half.

1135. Are you frequently subjected to floods?—Yes.

1136. Are those floods an advantage or a detriment to the property?—They are an advantage in one respect; if we get them in winter the next crop of grass is a good one, but it is of coarse quality. Then, on the other hand, they are detrimental to the inhabitants of the houses within a certain distance of the river. If a flood remains more than a month or two at a time, there is a considerable deposit, and, of course, when the warm weather comes, the smell is very offensive.

1137. And it renders the place unhealthy?—Yes, I think so.

1138. Do the floods reach any habitations?—Yes, they run through some of the houses.

1139. Viewing it as affecting your father's property, would you desire that steps should be taken to regulate and control these floods?—I think they might be regulated with great advantage; not entirely restrained; we could not do without them.

1140. You would be glad to avail yourselves of the floods so that you could control them?—Exactly.

1141. And in order to carry out such works as would allow of that control, would you be willing to be rated for the purpose?—I think it would be fair to rate the house property affected by the floods, but not the meadow land. The arable land would be benefited no doubt, by being freed from flood-water, but it is questionable whether the meadow land would be to the same extent.

1142. You think that the house property should be rated?—Yes.

1143. I understood that the meadow land would be benefited by controlling the floods; therefore should not that be rated too?—It might be rated in a smaller ratio, say, at one-fourth or one-half; the soil is very gravelly, and in a dry summer the grass easily burns.

1144. As regards the action of the Thames Conservancy on your property, are you benefited by that body, or injured?—Rather injured, I should say. The weirs are higher than they need be for the purpose of agriculture.

1145. Thereby causing the floods to be higher

Chairman—continued.

too?—Exactly. The water is always within two or three feet of the level of the land, so that there is little or no room for any surplus.

1146. Do you think if the Thames Conservancy were so constituted that landed proprietors and local authorities were represented at that Board, that then the interests of the land proprietors would be met?—I think the present representation is rather small; there are only four members, I believe, representing the Upper Thames.

1147. Would you wish that representation to be extended?—Yes, I think there should be landowners, millowners, and farmers; those are the three interests which require representation, in addition, of course, to those of the towns affected by the floods.

1148. Do the mills affect the streams in your neighbourhood?—Yes, they are very much worse than the navigation; and for this reason, that only four or five or six feet of water are required for the purpose of navigation, but many of the locks are very much higher than that, for the purposes of the mills.

1149. Are you near Shiplake Mill?—Yes, within two or three miles.

1150. Does that mill tend to increase the floods, as regards your property?—There is another between us and Shiplake; it is called Marsh Mill.

1151. That does increase them?—Very much.

1152. And does Shiplake Mill affect it also?—I should look at it the other way; the mills below us affect us more than the mills above, in damming back the water.

1153. Those two mills you have alluded to are above you?—Yes.

1154. But there are mills below that dam up the water?—The next mill is near Hambledon or Mill End.

1155. And by damming up the water there, the floods are increased?—Yes.

1156. Have you any suggestion to make to the Committee as regards the jurisdiction over the river, and into whose hands it should fall?—I think, probably the interests of the Upper Thames would be better represented if the meetings took place occasionally at Reading, or Oxford, further up the river in fact.

1157. You have heard two witnesses who have suggested that the jurisdiction should be divided among three bodies; one, the Thames Conservancy with, powers extending up to the Teddington;

*Chairman*—continued.

dington; another, the Drainage Commission, with powers extending up to Long Whittenham; and the third, for the upper part of the river, all of them being subject to the control of a Government department; how do you consider that system would work?—I should think it would probably work better if, instead of separate Boards, there were separate committees of the same Board.

1158. Would you like one controlling body with two or perhaps three separate committees?—Exactly so, representing the different districts and working in the different districts.

1159. And there might be sub-committees of districts?—Yes, if necessary.

1160. And with such an arrangement have you considered what public department would be the better to control the whole, so that it should act harmoniously?—I do not see any particular reason why it should be separated from the present Board, if the interests of the Upper Thames were better represented upon that Board.

1161. But supposing there should be any conflict of authority, or supposing that the objects intended to be carried out by such a Board were not fully or duly carried out, is there any Government public department that you can suggest that should be appealed to under those circumstances?—Probably the Inclosure Commissioners, or the Drainage Commissioners.

1162. And in your opinion such a body, one body with two or three committees controlled by the Inclosure Commissioners, may carry out the objects satisfactorily?—I think so.

*Mr. Walter.*

1163. Have you any information as to the amount of tonnage that passes down the Thames on your part of the river?—No, but it is now very small indeed; it is chiefly used for pleasure boats.

1164. Has it diminished in your recollection?—I do not know whether it has diminished, in the last two or three years very much, but some few years ago it was diminishing very much indeed.

1165. Have you any knowledge of the respective interests of the riparian owners, the interests of the millowners, and the interests of the navigation?—The interest of the navigation is the smallest of the three, except as regards pleasure boats. The millowners would not be injuriously affected by lowering the head of water in many instances, though they might be in a few.

1166. Do you think they are so afraid of losing water, when they have got it, that they keep the river unduly high?—I fancy the water is kept up higher now, in some cases, than it used to be. Some of the locks have been repaired, and a great deal of water is now water-logged, which used not to be so. One instance I know, about half a mile from the river, where the land used to be regularly cultivated as arable land, and it has been impossible to grow a crop there for five or six years now.

*Sir Trevor Lawrence.*

1167. Is the letting value of land, as far as you know, on the banks of the river, decreasing at all?—It remains about the same; that is the agricultural land.

1168. I mean, of course, the agricultural value?—Yes; the building value is very much higher.

1169. Is there any system by which, when it becomes evident that there is going to be a severe flood, the locks and the mill heads are all opened so as to allow the passage of the water?—Some of the locks are so very much out of repair, that it is impossible to do it; it is gradually done, but not in a short time.

1170. I suppose if a free passage were allowed to the flood water, so far as the existing channels go, that is all that can be done at present?—At present.

1171. Is there much obstruction to the course of the river, from weeds, mud-banks, and similar things, in your part of the stream?—Not so low down.

1172. There is no difference in that respect, in the last few years?—I think the river has tended to silt up; there are more banks than there used to be.

*Mr. W. H. Gladstone.*

1173. Have you suffered from summer floods?—About two years ago we had a summer flood about the middle of July.

1174. I suppose that is what does the greatest mischief?—In that case it carried away 30 or 40 tons of hay; I forget exactly the quantity now; it was just ready for carrying, and it was entirely ruined.

1175. Then it is the possibility of these summer floods which makes you desirous for something to be done?—I think if the locks were in perfect repair we should have no summer floods. That is the only one which I remember, in the course of the last 24 years, except in September or October, when we sometimes get them, but not so early as July.

*Mr. Hall.*

1176. Did I understand you to say that you thought house property and arable land ought to be rated, but not the meadow land?—I think all the land should be rated, but not exactly at the same ratio; meadow land would be less benefited than arable land; but there is a very small quantity of arable land within the flood district.

1177. In what way is the arable land benefited?—I should say the meadow land is benefited by the floods, but not the arable. The regulation of the water would be a great advantage to the arable land, and therefore it should be rated in a higher proportion than the meadow land, where the benefit would be more doubtful.

*Admiral Egerton.*

1178. As regards the state of Hambledon Lock, has anything been done to that by the Thames Conservancy?—I believe they have done a good deal there during the last year, but I have not been there.

1179. You do not know of your own knowledge?—No.

*Mr.  
Mackenzie.*  
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Mr. WILLIAM EDWARD SAKER, called in; and Examined.

*Chairman.*

Mr. Saker.

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1877.

1180. You are the owner of Shiplake Mill, I believe?—I am owner of the machinery. I lease the buildings and water-powers of the mills, but I am owner of the water-wheels, three water-wheels, machinery, and plant of paper mill, and all the mill property; so you may call me the half owner, perhaps.

1181. Is it a flour mill?—No, it is more a paper mill; I have a corn mill, also a paper mill, but it is very little used.

1182. Are you often subject to floods?—As often as any other mill on the river, I should think; in fact we are generally considered to be worst situated for the Thames floods of any mills on the river.

1183. In the last two years how long have you been under water?—This last heavy flood we were shut nearly two months; we were shut entirely for six weeks, and the rest of the time we had better have been shut than to go on, almost breaking the machinery by forcing the works.

1184. So that your works were stopped by the floods?—Oh, yes, entirely; we could not move.

1185. Do you consider that your mill causes floods, or adds to them?—No, and I will tell you, if you will bear with me a little while, where I have the mills, and when they add to the floods. You must take into consideration that, in flood times, say when the water is six inches above the ordinary high-water mark, supposing the river to be full then, we have got out all of what we call the lock tackle, all the means available for taking away the water, or passing through flood-water to next reach below us, and just about that time, if rains continue, the floods continue to rise, and consequently extend, and at the close of the week, you understand, the mill, that is the water-wheels, is shut at 12 on Saturday night. Now, taking it into consideration that at that time, at the height of the flood, as we may call it, all is opened that can be opened, to take the flood-waters away; of course you have got nothing at all to counteract the evil effect of the mills shutting between 12 o'clock on Saturday night and 12 o'clock on Sunday night—24 hours—and during that time the flood is extending itself in rather more than the ordinary manner in that 24 hours from Saturday night to Sunday night, on account of there not being any additional outlet, from the shutting of the mills. There is where the mills increase the floods; at that time they shut down their water, and they shut it down just at a time when they are pulling through the wheels twice the ordinary quantity of water on account of the difficulty of driving.

Mr. Walker.

1186. Can they not remedy that defect by cutting a side sluice?—They could remedy it simply by adding to their side locks, better expressed by enlarging or adding to cubic capacity for output of the "flood" locks.

*Chairman.*

1187. But is not the effect of your mill, and that of every other mill, this: supposing a flood to be above you, the very fact of the water being dammed up at your mill tends to increase the

*Chairman—continued.*

flood?—Yes; but you will own, I suppose, that the water is dammed up for the sake of the navigation, and we are only using the water that would be running to waste if the mills were not there.

1188. Then there is no water dammed up for mill purposes alone, but only for navigation purposes?—No, I should think not. But, although I am a mill user, I certainly must say that there cannot be any public evil in having mills on such streams as the Thames.

1189. It is your opinion, then, that they do not affect the floods at all, as I understand?—Oh! begging your pardon, any impediment must affect the floods. But the thing is so obvious. The reach of a river ought to be as easily emptied, or a proper portion of it, into the next, as it would be to empty water out of one cistern into another, if the one cistern is the four feet above the other, by simply having the means of taking the water from one reach into the other. That is all that, in my opinion, is wanted; and that is all that, in my opinion, causes the Thames floods. I have had 25 years experience of them, and some of them very sad. We had, in 1852, a very heavy flood, and have suffered a great deal from floods, and have had a great deal of experience of them, but I do not see that the public would gain from abolishing the mills; it seems to me to be an astounding idea.

1190. In case of floods, are you aware whether the Thames Conservancy have adopted measures in certain portions of the river, when there are floods, for opening the weirs so as to remedy them, as far as they can?—I know of one where they have, and I have a knowledge of one where they have not. Seven years ago they put up a new lock at Shiplake, that is, between Shiplake and Sonning, and, for convenience sake, I will call these large locks flood-locks, because that is what they really are, for they are never entirely taken out, unless there is any great excess of water, so that you might term them flood-locks. They made a new flood-lock there; they extended it, and made it much larger than before, and if they had made it much larger still I should have had no objection, although it diminishes my head in height. But I concluded that, as they had begun on that principle of making the flood-locks larger above, the locks below, of course, would have been made larger too, but that they did not do. Unfortunately, four or five years ago, being in a hurry to get what we term a "blow" of the lock below the next, at Marsh Lock, in a short time they allowed the sill of their flood-lock to be raised five or six inches, and that has done a wonderful deal of injury above Marsh Lock and Shiplake Lock, towards Sonning. I maintain if they had put as good a lock at Marsh Mill, as large and as capacious as we have got at Shiplake, we should have suffered very little in our neighbourhood from these last floods. Another thing I must tell you, if you will excuse me, is this, with regard to Shiplake Lock and Marsh Lock, because what is applicable to one reach is applicable all the way down; there is the river Lodden, which is a third of the Thames, so to speak. They have got less means of outlet from Marsh Reach to the reach below than we have

*Chairman*—continued.

have got up at Shiplake, with the Lodden in addition, so that if they were to almost double their outlet at Marsh Lock they would not be doing too much, in proportion to what we have got at Shiplake, and they would be doing a great benefit by extending the locks there. Seven years ago they made an excellent lock, which I just now termed a flood-lock, to take the water away, so that we are not at all injured by our own locks, as regards the retention of the water from Shiplake up to Sonning.

1191. Then, as far as your experience goes, in this particular locality the Thames Conservancy are taking due steps for the keeping up of the navigation, and have not increased the floods by any operation of theirs?—I said just now, they had a little in the one below, but otherwise I do not know of any, and I rather think that was in haste to get it over, and trying to get it done in a certain short time, that they raised the sill.

1192. An accidental circumstance?—But it has been a considerable injury.

1193. You have no property yourself in this particular locality?—Yes, I have some land below, about half a mile; Oxfordshire side, "Lashbrook Green."

1194. Is that land injured or benefited by the floods?—It is generally flooded; it lies low, and it is flooded almost always whenever there is a flood. Of course, if the floods extend any time, we feel it for a longer time than we should if they were modified.

1195. Is it marsh land?—No, it is meadow land; we never have anything on it but grass, of course.

1196. But, on the whole, your opinion is, that mills on the river do not tend to increase the floods?—Oh, no, I will not say they do not, but, that they should not, because if, as is the case, probably in most cases where there is not a sufficient outlet from one reach into the other, the stoppage, by almost anything, increases the flood, and they certainly do increase the floods from Saturday night to Sunday night; but the reason of it is, as they shut down, and cease their

*Chairman*—continued.

outlet of water, there are not at flood times, any surplus means at flood-locks to open other places to counteract the effects of the mills stopping. You can quite see how the mills must extend the floods, in shutting them up, because the water cannot come through the mill streams when they are shut.

*Mr. W. H. Gladstone.*

1197. Would it be possible, do you think, by locks as perfect as you could make them, to counteract the effects of the mills in stopping back the water?—Most certainly, there cannot be any question of it, I think, by enlarging most of the flood-locks.

*Mr. Hall.*

1198. Would not that unduly take away the head of water which is required for the mill?—If there was too much you must shut a little off; what do you do if you have a tap at the bottom of a cistern, which runs too much water off? Why, you turn it off partly.

1199. Then you would put these locks under the control of the millowners?—That is a large question to enter into; I have advocated that before, but, under present circumstances, I should hardly say so.

1200. If it is not under the control of the millowners, and it is used to let off the flood water, which the mill stops back, you would find the head of water too much diminished for your work?—Yes, we sometimes complain of that; but I cannot but think myself, that it could be so managed, that the water would be best, if placed under the control of the millowners, or the mill-managers; certainly, there must be some overlooking, as it were, to see that the thing is kept in proper order, and there can be no people so capable, and in whose interest it is so necessary, as it is to the millowners, to keep the water in a proper and ordinary condition, because what suits the navigation suits the mill work; there is nothing does mills more injury than an excess of water.

*Mr. WILLIAM WOODBRIDGE, called in; and Examined.*

*Chairman.*

1201. You are Mayor of Maidenhead, I think?—Yes.

1202. And you have some considerable experience of the floods of the river in the neighbourhood of Maidenhead?—I have.

1203. Have the floods this last year reached the town?—The floods for the last two years have extended, I suppose, two miles on the river banks and about three quarters of a mile into the borough; in that part there are a considerable number of houses, especially a great number of cottages, and it causes a very great deal of suffering; in fact, we had two floods in each year in 1876 and 1877.

1204. You had a flood last December, and another when?—December and January; I do not quite remember when; and the previous year too.

1205. And you have had one since, I think?—Yes.

1206. Have those floods reached any of the 0.14.

*Chairman*—continued.

cottages?—Yes, they have run through them to a depth of two or three feet in the cottages.

1207. Besides the inconvenience to those occupying the cottages, has it injured them as regards health?—Very much; fever and different diseases have followed.

1208. In the case of those floods, have you observed the colour of the water?—Yes.

1209. Is it very turbid, or clear?—Not clear; it is turbid, and that has very much affected the wells in the locality.

1210. Has it made the water in the wells turbid?—Yes, and it comes in contact with the cesspools, and runs out into the wells.

1211. And has the manure from the land, and the manure heaps been washed into the river at all?—Yes.

1212. On the whole, should you imagine that the water in the river was polluted by these floods?—Very much.

1213. Has your corporation taken any steps to prevent

*Mr. Saker.*

11 June  
1877.

*Mr.  
Woodbridge.*

Mr.  
Woodbridge.  
11 June  
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*Chairman*—continued.

prevent the floods, or to control them, in your immediate neighbourhood?—Well, we have no possibility of doing anything to any extent.

1214. Have you applied to the Thames Conservators to take any steps?—No, I have not.

1215. Do you consider that their action has tended to increase the floods in your neighbourhood, or to diminish them?—I consider that the locks and weirs, and, in fact, all the bridges are obstructions, especially where they have large buttresses. Everything they put in the river, to lessen the width of it, is an obstruction, of course.

1216. But as regards the Thames Conservators, what do you say?—Well, we thought that they should have opened the locks in a time of flood, to have emptied the river as much as possible, to enable it to receive the flood water.

1217. Has any application been made to them to open these locks?—I am not aware of any.

1218. As far as your own experience goes, do you think that the Thames Conservators have used due diligence in times of floods, in surveying the river, and taking such steps as should reduce those floods?—I cannot say that; I think sometimes the sills have been raised.

1219. In the times of floods?—No; but they have been in the time of repairs; and that of course causes an obstruction.

1220. Permanently raised?—Yes.

1221. So that the bed of the river generally has been raised?—Of course.

1222. Suppose steps were taken to remedy these floods, would your borough object to be rated for the purpose of meeting the expense?—If it was not excessive.

1223. You would be willing to bear your fair share, provided the works were carried out with due economy?—Yes, and effectually.

1224. Is the navigation of your part of the river on the increase or diminishing?—The pleasure traffic is on the increase.

1225. And as regards the barge traffic?—I should not think that has increased much; it is about the same.

1226. Have you any point that you wish to give information upon particularly to the Committee?—No, not any more than that these floods are a source of great suffering to the inhabitants of the borough, and they would only be too glad if some steps were taken to remedy them.

*Mr. Walter.*

1227. Do you know that the floods have been worse since the erection of the new lock and weir near Bray?—They have been worse than they have been for many years. I think 1852 was the worst high flood previous to this.

1228. The rainfall in the last year has been almost unprecedented, has it not?—Yes, and the drainage of the land has added to the floods.

1229. You think the drainage of the land makes it worse?—It takes the water from the land by the river.

*Sir Trevor Lawrence.*

1230. I suppose these cottages to which you refer in Maidenhead have always been subject to inundation in the periods of severe floods?—Yes, at times; but not so much as of late.

1231. Do you know what was the relative height of the highest flood during the past

*Sir Trevor Lawrence*—continued.

winter, as compared with the highest flood in 1852?—About the same.

1232. So that in a season of severe floods, there has been no material alteration in the height of the floods during the last 25 years?—No, I think not, only in their frequency; they have been more frequent.

1233. You spoke of opening the locks, are they in a sufficiently good condition of repair for them to be able to be opened?—I think they are kept in good repair, but it is the locks below us, lower down the river, which would affect us.

1234. You said that the health of the borough had been affected; is that statement based on any statistics?—Yes, from the statement of the medical officer of health, Dr. Woodford; in fact, he has written us to say that since the floods the death rate has been 40.

*Admiral Egerton.*

1235. I suppose there has been a great deal of building in the borough of late years?—Yes.

1236. Do you not think it is the case that some of those houses have been built with perhaps too little regard to the subject of the floods; I mean they have extended further towards the lower ground?—In some cases they have.

1237. That would of course account for a good many of those houses being flooded?—Yes.

1238. You spoke, I think, of the action of the Conservators in raising some of the weirs; do you know which weirs have been raised, and to what extent?—No.

1239. You do not know, personally, about that?—No, only from information which I have had.

1240. You have reason to believe that they have been raised, but you do not know it of your own knowledge?—Yes, I do not say it has been intentionally done.

1241. Do you happen to know whether Bray Church has been inaccessible during any of these floods?—Yes.

1242. How often, in your recollection, has that happened?—In 1852, and in the floods during the last two years.

1243. Two or three times since 1852?—Yes.

*Mr. W. H. Gladstone.*

1244. Are there any means which you can suggest for preventing the injury caused by floods in Maidenhead?—One of the most simple remedies, I think, is to open the locks. It would be an inconvenience to millowners, no doubt, to do that, but the question is whether they would gain in the long run by getting rid of the floods.

1245. You think that is doubtful, do you?—As to whether they would gain, or not, I am not prepared to say.

1246. But suppose the water rises to a certain height, are there any means by which you could protect yourself?—I do not see any, and unless it was done in connection with other parts; from Corkham to Maidenhead you will see there is a long line of low lying land.

*Mr. Hall.*

1247. Did I understand you to say that your death rate had increased to 40?—The medical officer of health states so.

1248. That is very high, is it not?—Yes.

1249. Was



Mr. Hall—continued.

1249. Was that owing to any epidemic?—Yes, caused by the floods.

Sir Trevor Lawrence.

1250. That was only temporary, I suppose?—Temporary.

1251. What is your average death rate?—About 20.

Mr. Hall.

1252. Did you have any experience, or did you put it down to the action of the floods?—We had a few cases of smallpox, and a great many cases of fever. The fever arose from the floods, no doubt.

Sir Trevor Lawrence.

1253. Typhoid fever?—Yes, in some cases.

Mr. Richardson-Gardner.

1254. No doubt your experience of the river has lasted over a great many years?—Yes.

1255. During the time that you have known the river, have the floods taken place very often?—Not so frequently as of late.

1256. The Report of the Thames Conservators to the House of Commons, in accordance with the order of the House, gives only four very serious floods from 1821 to 1877, a period of 56 years?—Yes.

1257. In your experience, have floods taken place a greater number of times than four, during that period?—Oh, certainly, but, perhaps, what the Conservators would not call severe; in 1852 we had a very high flood.

1258. How many times do you think during that period Maidenhead has been swamped by water from the Thames?—Well, four times in the last two years.

1259. You have had water in the houses at Maidenhead?—Yes, and have been obliged to take boats. One flood cost us very nearly 100*l.* for boats, and so on, to get people about to their houses.

1260. Would you not call that a severe flood?—I should.

1261. Of course it is a question of degree, in the mind of the Conservators and yourself, but still, during all these 56 years, I ask you whether you remember floods serious enough, at all events, to have entered the houses of the inhabitants, many more times than four?—We have had four in two years. I am sure it is more than that.

1262. How far back can you go, in your remembrance of Maidenhead?—I can remember some 40 years.

1263. During that 40 years you have had experience of Maidenhead, how many floods do you think there have been?—I cannot call to mind how many, but certainly there have been more than four severe floods.

1264. More severe lately?—More severe lately.

1265. You are aware that the Thames Conservancy obtained an Act in 1866 to take away the sewage out of the Thames and dispose of it in other ways?—Yes.

1266. You have had a notice to that effect at Maidenhead?—Yes.

1267. Have you begun to do anything of that kind?—We have done it some years back.

1268. And what did it cost you?—I cannot say the whole of the cost, but we have done it at 0.114.

Mr. Richardson-Gardner—continued.

different times as we could spare the money from the rates, so that we did not have to borrow money for it, but we got it done, as we found the money.

1269. It came to a large sum?—A considerable sum; we have not completed it yet, but still we do not take any sewage into the Thames.

1270. May I ask you how you dispose of your sewage?—By irrigation.

1271. You have an irrigation farm?—Yes.

1272. When the Thames overflows does that get on the irrigation farm?—A small portion of it.

1273. And upon that portion it must carry the deposit that you place there back again into the Thames?—It must to some extent.

1274. Therefore you have carried your drainage at a considerable expense on to an irrigation farm, in accordance with the Thames Conservancy Act of Parliament, and as I collect from you it has been brought back again?—Not quite to the extent perhaps as you would imagine, because it is some distance from the Thames, and of course what is washed from this particular farm would be deposited partly on the meadows which it passes over; it would not all go into the Thames.

Chairman.

1275. How far is this farm from the river?—About half a mile.

Mr. Richardson-Gardner.

1276. Is it situated on high land?—No, not very high.

1277. The overflow touches part of it?—Yes.

1278. May I ask you again whether when the Thames overflows the water enters the drains of the town, scours them out, and then goes back again into the Thames?—I think it would with regard to a portion of them. We have two levels, and it would take a portion of the low level.

1279. Back again into the Thames after you having been at a great expense to remove it?—A portion of it must go there.

1280. And so it would be no doubt with regard to the manure deposited on the ground by the agriculturalists?—It must be so.

1281. All would be washed back into the Thames?—Yes.

1282. So that the water companies who pay this sum of money to the Thames Conservancy for having the Thames kept clear from drainage at your and other people's expense, in fact get these impurities again in the time of the floods sent down into their reservoirs?—Yes.

1283. And the people of the metropolitan district drink it?—Well, they filter it first.

Sir Charles Russell.

1284. Are the weirs at Maidenhead actively looked after?—I think they are kept in fair repair.

1285. I do not mean so much about repair as whether the puddles are taken up quickly enough in the event of a flood or anything of the kind?—I cannot answer the question.

1286. Do you know whether any of the weirs are in charge of women?—I am not aware of that.

1287. Has any proposition been made to the town of Maidenhead to submit to any rating, K  
supposing

Mr.  
Woodbridge.  
11 June  
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Mr.  
Woodbridge.  
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1877.

Sir Charles Russell—continued.

supposing a scheme was adopted to alleviate the floods; do you know anything in your position which would lead you to think that the town of Maidenhead would consent to be rated for the purpose of relieving the floods?—Yes; if not excessive.

1288. If the rating was not excessive?—Yes.

Sir Trevor Lawrence.

1289. What is the state of the effluent water

Sir Trevor Lawrence—continued

from your irrigation farm?—The land absorbs it all except in flood time.

1290. There is no effluent water?—No.

1291. And the principle upon which your irrigation farm is established is that the sewage, by passing over the land, becomes purified?—Yes; there are small trenches cut in the land for it to run out.

1292. That is the principle of it?—Yes.

1293. Is it grass or arable?—Grass.

1294. All grass?—Yes.

Mr. STEPHEN PULLIN, called in; and Examined.

Chairman.

Mr. Pullin.

1295. You reside at Harton, near Wraysbury?—Yes.

1296. And you have had some experience of, and opportunity of remarking, the floods in the Thames, and their effect?—I have; I have been all my lifetime on the banks of the Thames.

1297. Do you own property there?—Yes, both as occupier and owner.

1298. You are a farmer?—I am a farmer. I occupy about 800 acres now; but I have had about 1,200 acres until the last year or two.

1299. Is the land in your occupation subjected to floods?—Some of it.

1300. And do you consider that it is injured thereby, or benefited?—Very much injured.

1301. You do not find that the deposit from the river is an advantage to your low-lying land?—No, quite the reverse.

1302. Then you would desire that steps should be taken to prevent the floods?—Most decidedly; I have been advocating it all along.

1303. Would you, as an occupier, be willing to be rated for the purpose?—Yes, I should be very glad to be rated, provided we could get rid of the water.

1304. And provided the works were carried out beneficially and economically?—Yes.

1305. You would be willing to be rated?—Yes, I can answer for all the neighbourhood.

1306. All the neighbourhood would be willing to be rated for carrying out the works to prevent floods?—Yes.

1307. In what way is your land injured?—By floods lying upon it, by the water being kept back and lying on it, and of course the crops are injured; we are obliged to re-sow, and not only that, but we get all our manure thrown away.

1308. When it is in a heap?—No, when it is in a heap?—No, when it is spread on the land.

1309. And where does that manure go to?—Into the Thames.

1310. Do your manure heaps get a washing occasionally?—Oh, yes, we have had them covered; in fact, carried quite away, and tons of wurzels carried away.

1311. Carried into the river?—Quite into the river, and gone.

1312. We have had evidence as regards the upper part of the river of land being much benefited by the floods; your experience is quite the reverse?—Quite the reverse; indeed a great deal of ours is arable land; there is not a great portion of it, except on the Runnymede side, which is meadow.

Chairman—continued.

1313. Is the Runnymede occupied by you?—No, that is on the other side of the river.

1314. The Runnymede is frequently under water?—Oh, yes; generally impassable in the winter. In flood time it has been this year; indeed the roads round my locality have been quite impassable this year; we have had water six feet in the roads by the cottages, and quite three to four feet in the cottages.

1315. What is the longest time which you can recollect your land being under water?—This year we have had 8 or 10 weeks consecutively; it has gone down a little and then raised again, as the river swells. We get the water dammed back upon us. In fact it has scarcely gone now. I can myself say that I have some land now where it has not gone, although the Thames has gone down, but we cannot get rid of it so fast; after it once gets down in the Thames, it takes a considerable time before we can get rid of it, because it swells up in some of the fields.

1316. I think you have conceded that you would be quite willing to be rated to carry out individual works?—Yes, to a certain extent.

1317. Your fair share; and supposing the works were carried out well and economically?—Oh, yes, I should be very pleased to pay my share.

1318. Have you at all considered what works would be enough?—I think there might be a very great deal done now to alleviate the floods if proper sluices and weirs were constructed; self-acting ones. My idea is that the sluice-gates are not opened at the proper times; indeed, I can point out one or two that I know, which have not been opened in proper time, and in one or two of the weirs that have been constructed for some years, now, the sluices were much higher than I think they ought to be. For instance, I have a son-in-law occupying a large farm close to Maidenhead, at Braypoint; there has been a lock put in there. Some years ago there was no lock, when a brother-in-law of mine held the farm, and now that is a very great impediment. This year the water has run in front of his house, round by his two farms, into the river again. Now that was not the case some years ago, except in one year, and that was in 1852, I remember; but now it invariably does; in fact, it has been impossible to get out of the turnpike road once or twice down to his house; it has run all round the farm; and I should say now that he is injured this year to the extent of 500 £, at the lowest; and I have no doubt if a competent surveyor went to value the injury, that

*Chairman—continued.*

that he would put it at nearer 1,000 *l.* than 500 *l.*

1319. And do you attribute that increased flooding to the sluices having been raised?—I attribute it a great deal to this, the river is now growing up very fast. What with the eyots on the river, and so many locks, the water does not get away fast enough. It is the backwater that hurts us; it is dammed up, and cannot get away. If the mouth of the river was wider, and the water was allowed to pass as soon as it comes down the river, in my opinion it would be a benefit to the upper part of the river.

1320. Have the eyots increased in size?—Very much. They are increased by the trees and the washings from the sides. The Thames Conservancy has done a great deal; but what is the consequence? They let the people gravel; but they do it in one place, and then another is left. If it is to be done, it should be done properly from one end to the other, to make the channel of the river deeper, that would take away the surplus water when it comes. Moreover, with these locks, if they were self-acting ones, the moment there came a flood they would open themselves and the flood would pass, but now they are at the mercy of a man to go and pull them up. I could give you an instance. Last year I was at my son-in-law's, Mr. Cross'; there was a good deal of water had come, and a great deal in the Thames meadows; we went down to the lockman below at the lock which is between his two farms, not a quarter of a mile from where he lives, and within 200 yards of his further farmhouse; we hallooed to the man and said, "There is a great deal of water about; you had better pull up all your gates, or we shall have a flood before to-morrow morning." The old man or the old woman, I forget which, said, "Yes, it is all right"; and then we went away. What was the consequence? They were never pulled up, and the next morning we were all under water.

1321. Which lock was that?—Bray Lock, at Bray Point. Now, if that lock had been properly pulled up in time, a great deal of that water would have passed. I do not mean to say they would not have had some water, because it is a moral impossibility to prevent a flood altogether, but the waters may be alleviated. If the Thames was properly open from London up to Maidenhead Bridge, I think it would get rid of a great deal of the water.

1322. Without any new works?—That I will not say; I am not engineer enough to know that.

1323. Because you did state it would be so with the present arrangements?—Yes; my idea is that the locks should not be under the power of any man; that they should be self-acting; that the moment there is a pressure of the water that they should open themselves. At Colebrook Mill, 10 years ago, there was a little gate there that a man constructed, so that the moment he got a pressure of water it passed his backwater and saved his wheel; and the same could be done on the Thames.

1324. You have experienced damage to your property, which you attributed to not properly attending to the opening of the locks?—From the water not being allowed to go away, or rather the river not being opened enough to take the flood water away.

1325. Have you, in consequence, taken any

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*Chairman—continued.*

steps so that you should not suffer this damage in the future, by writing to the Thames Conservators?—No; I have attended two or three meetings where the matter has been under consideration.

1326. You mean meetings of the Association?—Yes; I have not had any conversation with the Thames Conservators.

1327. But you have never, in consequence of the damage done to you, taken any steps yourself?—No. I did not know where to apply, or I certainly should; but then, of course, an individual like myself would have got very little redress. I do not know the gentlemen of the Conservancy. I have no doubt they would attend to everything that is right, but still I had not the means individually of bringing it before them.

1328. You did not think they would pay much attention to you, and so you did not apply?—That is it.

1329. But you would be very glad to be relieved from the recurrence of the floodings?—I should certainly be very glad. I have got a long lease of my farm, and if these floods are to continue as they have been, I shall be very glad to get out of it at a loss.

1330. You have not applied to your landlord for any allowance?—I have, and I hope I shall get some; I do not know whether I shall or not. But I have some property of my own on the Thames, and I only took the rent of it on Saturday last; it is not a large piece, 14 acres of land at Datchet, close to the Thames; and the man said, "I hope you are going to allow me 5 *l.* back." I said, "What for?" He said, "I have lost all the crops, and have been obliged to sow them again."

1331. Then you were applied to?—I was applied to; he asked me for 5 *l.* for one half-year.

1332. And you made no allowance to your tenant?—No; that was on a Saturday, at Windsor Market. I think we shall all make an application. Our rent-day is next Monday. We intend, all of us, to make an application to Colonel Williams for a reduction.

1333. A reduction of rent?—Yes, an allowance.

1334. An allowance for the damage done by these floods?—Yes, because we are very seriously injured. I assure you it is not a small matter, it is a large affair.

1335. Do you hold 800 acres under Colonel Williams?—Not quite all under Colonel Williams. I hold about 800 acres; I did hold 1,200 acres until the last three or four years, that is, on the banks of the Thames in front of the Bells of Ousley.

*Mr. Walter.*

1336. What is the next lock below you; is there one between you and Staines?—Oh yes, there is the Bell Weir, and that is a very great obstruction.

1337. What is the fall of that?—I really cannot say, but it is a very great fall.

1338. And dams up the river considerably?—Yes; and then there is another, Old Windsor Lock.

1339. Then there are two between you and Staines?—Yes.

1340. How far are you from Datchet?—We run into Datchet between Wraysbury and Datchet;

*Mr. Pullin.*

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Mr. Walter—continued.

Datchet; indeed, I hold land on Datchet Common.

1341. The proper regulation of these locks would materially benefit you?—Oh, very much.

Sir Charles Russell.

1342. You have lived there a considerable time?—I was born there, and have lived there all my life.

1343. Do you not generally know when the flood is coming, before the water is actually down on you?—We may expect it by excessive rains, we cannot know it by anything else.

1344. I myself live on a river subject to floods, and I generally hear people say, "Now we shall have a flood"?—Oh, yes.

1345. Supposing, upon an occasion of that kind, instead of having self-acting gates, as you proposed, the people who were in charge of the gates were made to open them, then you would get rid of the water before the flood came?—Of course you would.

1346. Of course, if you have a self-acting gate, it is better than a man sitting up in his room and keeping the gate shut; but still you have not an opportunity of getting rid of the water at the time when the channel of the river can really take it?—Not unless you have a person you can really trust, and that is the thing.

1347. Do you believe, if you had somebody, whose duty it was to see that at a particular time these gates were all opened, that that would materially alleviate the floods?—Oh, I do not think there is a doubt about it; but then I think they should have a differently constructed gate. The under-current is all dammed up with these gates now, and you are only pulling the top off. Now, there is a great wash and a great current at the bottom of the gates. If they could be self-acting, and go over the sill, they would pass the waters; now you only get the flow of water. If you could pass the body of the water, you would relieve it half as fast again.

1348. You mean a turn-over?—Yes, so that it would pass the water from the bottom as well as from the top; until it gets that height it is only the top-water that can go over, you get no current from the bottom; if you could get a current at the bottom you would take the body further down.

Admiral Egerton.

1349. You mentioned Bray Lock; you meant the weir, I suppose, when you said the lock?—No; I mean the lock kept by the old man, Simon, I think his name is.

1350. But is there not more opening in the weir than there would be in the lock itself?—Oh, yes.

1351. Are there no means of opening that?—Only by pulling up the paddles.

1352. That would have been more effective than opening the lock?—Of course it would.

1353. You had no cause yourself to complain at the time, or did you make any complaint of it?—I think my son-in-law went down and complained about it; he lives there at the spot.

1354. Do you remember what time that was? No, but I could get you the date, no doubt; I do not know now.

Mr. Hall.

1355. Have you any opinion about embanking

Mr. Hall—continued.

the river?—In part of the farm that I have held at Wraysbury for two or three years we have a bank. Of course it is a very great benefit to keep the current going, but it does not prevent the floods, because they well up; it is a porous gravel soil, and for about 200 or 300 yards it will well up in the middle of a field, and there you get the flood until the Thames has gone down, and it is very much longer going down than it is rising.

1356. Will it well up, according to your experience, before the river has left her bed?—No, I think not; it only wells up at a certain height of the river.

1357. When does it well up; when it has got as far as the embankment?—When it has got nearly up to the top of the embankment.

1358. But your view is, that the water injures the land; you do not want the control of the water; you want to get rid of it?—There is no doubt we want to get rid of it.

1359. You do not care about the control?—No, we want to get rid of it. We have a large tributary, the River Colne runs in; the Thames gets full with the floods, and we get all that water thrown upon us.

Mr. Praed.

1360. You are more injured by the flooding of the Colne?—No, by the Thames; but the River Colne runs into the Thames, and when the Thames is flooded it cannot pass its own water, much more take the Colne water with it.

1361. You spoke about the self-acting sluice; who was the inventor of that?—I really do not know. It was a man who held a mill at Colnebrook, of the name of Westaway; it was on a small scale, and that was on the River Colne. Formerly a friend of mine, who lived there many years, was obliged to get up in the middle of the night to pass the water; but this man could go to bed comfortably, and in the morning the gate was open, and the water had passed; and as soon as the water was down at the proper height, it shut itself.

1362. That would not be applicable to weirs, I suppose?—Oh, yes, it would.

1363. In what way?—On any river, or any running stream, because the moment there was a swell of the water, it would pass it.

1364. That would depend on the pressure?—Of course; then you would not have the pressure until you got to a certain height of water.

1365. Then does it act from below?—It acts from below; it turns on a pivot.

1366. Then you might make the river dry?—No; the moment the water came to its proper height, it shut itself again.

Mr. Richardson-Gardner.

1367. In carrying out your view of opening a lock when you expected a flood to come, and its not being done causing a flood, supposing there was a telegraphic communication from the Board in London, right up to the head of the Thames, and the people at the head of the Thames communicated by telegram that the floods were rising, and so on, all the way down, and they were ordered to open their locks and sluices, and so let the water pass down; do you think that would be an advantageous course to pursue?—Decidedly; anything to get rid of it; you see it

*Mr. Richardson-Gardner—continued.*

it is the first water that does all the injury; you do not pass the water soon enough; if the water could be passed soon enough, we should not get all the back water; it is dammed up, and then it flows all over the country. For instance, it is a mile and a half direct from the Thames right up to here; that is such a thing as I never but once knew in my life before, and that was in 1852. We have had the water worse this year than I ever knew, except in 1852, and I believe then it was as bad. I remember going with one of the Messrs. Ashby in a boat from Horton to Staines, and we crossed the railway in a small boat. Now it has been on the railway, the Windsor line, something like a foot or 18 inches.

1368. You do think that a system of telegraphic communication from the head of the Thames downwards, and orders being passed to the lock-keepers to open the locks and sluices, would very effectually mitigate the offence?—No doubt.

1369. And that would not be a very expensive operation?—No; but if the eyots down the Thames were all kept properly, that would very much relieve the water.

1370. I think you said you were born at Wraysbury?—No, at Horton; but the property is the same.

1371. Your attention, of course, has been continually called to these floods of the Thames, suffering as you have from them during your lifetime; do you remember many serious floods?—Yes.

1372. How many, just in the rough?—I cannot say; I remember, I should think, ten or a dozen serious ones, but not like this year or 1852.

1373. Ten or a dozen serious ones, and others less serious, but still floods?—Yes; very seldom a year passes but we have some little flood.

*Mr. Richardson-Gardner—continued.*

1374. And you say all the manure on your land, to your great loss, is washed into the Thames?—Of course it is.

1375. And of course that tends to make the water impure which goes to the water companies?—Yes; that is a sort of thing I have not thought about myself; I was only thinking of the loss that I had sustained by the manure being washed away.

1376. Then you think that if the osier-beds and the weeds were removed, it would mitigate that evil?—Yes; there are one or two near Wraysbury, that want removing very badly indeed.

1377. What is your opinion about the mills?—Well, just on that part of the Thames we have no mills.

1378. And you have no experience of mills, so far?—No; but I believe that mills must be, to a certain extent, an impediment.

1379. Do they dredge for gravel in your neighbourhood at all?—The Thames Conservancy has; but you see we have a part of the Old Thames. A navigable part has been cut at Old Windsor, and the Old Thames runs round to us to Wraysbury, but of course that part of the Old Thames is not taken any notice of now. In some places it is nearly level. I have seen people in the summer walk across it, and I saw a person ride across it.

1380. When the dredging takes place, it is simply for the sale of gravel to those who will dredge for it?—Yes, I think so. I believe people are licensed to do it.

1381. And they pay for it?—Yes.

1382. But the Conservators of the Thames take no means to dredge the Thames in your neighbourhood themselves, as a public body?—I have never heard that they do. I know that they will pay to get gravel, and that these people have to pay for it.

*Mr. Pullin.*

11 June  
1877.

Friday, 15th June 1877.

MEMBERS PRESENT:

Mr. Coope.  
Admiral Egerton.  
Sir Trevor Lawrence.  
Mr. Richardson-Gardner.

Sir Charles Russell.  
Mr. Samuelson.  
Mr. Watney.

OCTAVIUS EDWARD COOPE, Esq., IN THE CHAIR.

Mr. HENRY DARVILL, called in; and Examined.

Chairman.

Mr. Darvill.  
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1383. I BELIEVE you are the Town Clerk of Windsor?—I am.

1384. How long have you been in that position?—Twenty-five years.

1385. And how long have you resided in that neighbourhood?—Upwards of 40 years.

1386. During that time has the state of the river been brought to your notice?—Constantly.

1387. Did you notice it under the old *regime*, before 1866?—Yes, I was one of the acting committee of the upper navigation.

1388. One of the acting committee of the Commissioners?—Yes; there were five districts, and the Commissioners were represented in each district.

1389. How many Commissioners were there to each district?—Three Commissioners for each district, and there were five districts.

1390. What was the extent of your jurisdiction?—Our jurisdiction extended from the London Stone, near Staines, to the upper end of the navigation at Cricklade.

1391. And you were appointed under old Acts of Parliament?—Yes; there were several Acts of Parliament; the first Act was the 21 James 1, and in that Act it is stated that, from time immemorial, the rivers Thames and Isis, from the City of London to Burecott, Oxon, and from Oxford to Cricklade, have been navigable; it is so recited in that Act of Parliament.

1392. And were 15 Commissioners appointed by that Act?—No, in subsequent Acts; there are seven old Acts of Parliament, the last being in 1812.

1393. The principal duty of these Commissioners being to keep up the navigation of the river?—Yes, to keep up the navigation of the river.

1394. In order to carry out works with that object, did the Commissioners raise money on loan?—They raised nearly 90,000 £. on loan, and they had then an income of something like 15,000 £. a year.

1395. An income arising from what?—From tolls of about 15,000 £. a year, which were reduced by the competition of railways to under 3,000 £. a year; and the consequence was, that the interest on the debt was unpaid.

1396. And is that debt unpaid still?—Yes; and I may say, for your guidance, that I was the cause of the navigation being stopped; I moved

Chairman—continued.

at Oxford a resolution in the committee under these circumstances; the various locks were out of order, and we had no money. We were about to enter into contracts to restore and reconstruct various works; and I objected to it, inasmuch as we were not a corporate body, and acting under a common seal, I, as a lawyer, believed that we should be personally liable, and I would not therefore incur pecuniary liability without we took counsel's opinion; counsel's opinion was taken, and counsel said that we should be personally liable. We then agreed to stop the works, as we would not incur any personal responsibility when we were in such a bankrupt condition; the consequence was that we went to the Board of Trade, and informed them of the facts, and a roving Commission was appointed; that Commission made its Report, and upon that Report the upper navigation was made over to the Thames Conservancy; that is the history of that transaction; but when that Act was passed none of the riparian boroughs had any notice of the Act of Parliament, and they were all very much surprised to find that the Act passed, transferring the whole of the property on the upper navigation, and all the navigation of the Thames Conservators when none of the riparian boroughs were consulted, and when enormous powers were given in reference to the sewage of the towns.

1397. The riparian boroughs must have been asleep?—Well, I am speaking simply of what was the fact. There are many Acts of Parliament passed without the knowledge of the persons who are effected by them, to my certain knowledge. In that particular case the Commissioners beat about to know where to get money; they did not know how to get money, and at last the happy idea struck them of taxing the waterworks companies; they put in a clause enabling the Conservators to tax the waterworks companies to the extent of 5,000 £. a year. That gave them funds; they then put clauses in the Act of Parliament to compel all the riparian boroughs to take the sewage of their towns and of the river, and the consequence is that the riparian boroughs have expended 600,000 £. or 700,000 £. in taking the sewage out of the river; and the Thames Conservators get the benefit in the shape of 5,000 £. a year from the water companies; that is the practical result of things.

1398. That was under the Act for the prevention

Chairman—continued.

vention of the pollution of the river?—It was under the 29 & 30 Vict. c. 89, the Act of 1866. Now Windsor had no notice of the passage of that Act of Parliament, nor, I believe, had Reading; it may be that Reading may have had; but Windsor had not.

1399. We will come to Reading presently; but you had notice, and had no opportunity of putting in a claim to be represented on the Conservancy?—No, if we had seen the clauses in the Bill we might have objected to them, but we could not have opposed the Bill out of corporate funds.

1400. But how were you, as one of the Commissioners, and an active one, prevented from joining in obtaining this measure?—We had no money to oppose any Bill.

1401. But did you not follow up the proceeding?—No, we had no funds.

1402. But did you not make inquiry as to what would become of them, or did you simply wish to die out?—We had no money. We told the Government our position, and they issued a Commission, and I was examined upon it, but I never knew what they did until I found the Act of Parliament passed; that is a fact.

1403. But an Act of Parliament does not pass *sub silentio*; this was only 11 years ago; an Act of Parliament is not usually smuggled through in that way?—I mean to say that Acts of Parliament are smuggled through deliberately. I declare that there are Acts of Parliament passed where persons are affected without their knowing it. I can give you an instance.

1404. You knew that the Commission being bankrupt was about to be abolished, and its powers to be transferred to some other body?—Will you allow me to say that you seem to be under some misapprehension about the fact that Bills are taken through Parliament and affect people without their knowledge. I know an instance where the Government took powers to stop up a road called Barrack-road in Windsor; it affected certain owners. The Bill had passed the Commons; they only had an opportunity by seeing it in the newspaper of knowing that such a Bill had passed; they then petitioned the House of Lords; Lord Sligo was in the chair, and he said it was a monstrous thing that Acts of Parliament should be passed affecting private interest, when the parties had no notice; therefore it is done, because I got protective clauses inserted by the Lords in the Bill in that very case.

1405. To go back to the question before the Committee; you moved for the extinguishment of the old Commission?—No, the suspension of the works.

1406. The suspension of the works, the Commission being bankrupt?—That is exactly it.

1407. And you gave evidence before the Commission which was appointed to consider as to what was to be done under the circumstances?—Yes, I did, but that was the difficulty; I gave evidence that we had no money; I gave evidence of exactly what had taken place, and the state of affairs; they then asked me how I thought they could provide funds; I said, "That is a very difficult question; you cannot take it out of the county rates; you cannot take it out of the parish rates; the riparian parishes will not let you rate them; the counties will not let you rate them."

1408. However this Commission kept on  
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Chairman—continued.

holding its meetings?—Yes, it was a roving Commission.

1409. And, as far as I am able to gather from you, it then seems to have passed out of your mind altogether?—I never saw their report.

1410. And the Act was passed without your knowledge?—Yes, that is true, and without the knowledge of the riparian towns.

1411. Were you town clerk?—Yes; and had no notice of it whatever.

1412. But did you not feel it your duty as a public officer, when a measure was being passed considerably affecting your town, to take some measures with regard to it?—I did not know that it was being passed, and if I had, the corporation would not have been justified in opposing the Bill out of corporate funds; moreover, I am not the borough remembrancer.

1413. But you know that the Commission was deliberating?—I knew that there was a Commission, and I knew they made a report; but I never do anything without I am instructed to do it.

1414. And you never volunteer?—I do not volunteer to do professional business; when I am employed, I act; if I were to oppose a Bill when I was not employed, I should not be paid.

1415. In fact, you did not consider it your duty, having given evidence before the Commission, to follow it up any further?—I did not think it necessary, as I did not give evidence as town clerk, but as an old Commissioner.

1416. And this Act for transferring the powers of the late Commission to the Thames Conservancy was passed without your knowledge?—I did not know it until the Act was passed, and I was surprised at it, and I mean to say that Windsor had no notice of the Bill until passed.

1417. And you took no steps whatever in opposing it?—No, I should have been very happy to have opposed the Bill, but the corporation could not legally oppose with corporate funds.

1418. Do you think that other riparian boroughs were in the same position?—My impression is that if the riparian towns had known the effect of the Bill, they would, if they had had the legal power, have joined us in opposing it. We shall be burthened with 80,000*l.*, and I believe Reading with something like 240,000*l.*

1419. We will come to Reading; you cannot tell us positively of any other borough on the river that was ignorant of this?—You can ask the people from these boroughs.

1420. Of course; but I am asking you?—There was no action taken by any boroughs on the banks of the River Thames to my knowledge, and they could not legally oppose, and the old Commissioners were in a state of absolute collapse.

1421. I gather from you that had you been aware of the passing of this Act, during its passage you would have advised your corporation to oppose it?—I should undoubtedly have advised them to have petitioned the House against the Bill, but they could not legally have opposed before the Committee, or devoted corporate funds towards the opposition.

1422. The upper navigation is now represented in some measure by the Thames Conservancy, I believe?—Either by four or five elected Commissioners.

1423. Is Windsor represented?—No, Windsor is not represented, except so far as it is represented by the four or five Commissioners; there were

Mr. Darvill.

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Mr. Darvill.

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Chairman—continued.

were four Commissioners at first, but I should mention this: I do not know whether you are aware of the constitution of the Thames Conservancy; I suppose you have evidence about that.

1424. You may take it for granted that we are aware of it?—I call the greatest portion of it commercial.

1425. You need not give evidence upon that; we are quite aware of it, and if there is any point upon which we wish to be enlightened, the Thames Conservancy will enlighten us?—I have no doubt they will.

1426. As regards the floods, during the many years that you have had experience, and resided in and been town clerk of Windsor, have you noticed any change in the state of the river within the last 10 years?—Ever since I have known the river it has been subject to periodical floods; I may say that the floods are annual, but not equal in volume. Sometimes they are unimportant, but at others they are very important; sometimes they are for two years in succession very important and very serious.

1427. Do you think that they have increased or diminished, or remain about the same, within the last 20 years?—I do not think there has been any great alteration; a heavy flood is a heavy flood, and you can tell pretty well where it comes from, and I do not think there has been very much variation in height; since the increased subsoil drainage they may have increased.

1428. You do not think that the drainage of the land has affected the volume of water in the river at times?—Well, I recollect a very heavy flood in 1852. As a matter of theory, I should say, undoubtedly, that the under-drainage, or subsoil drainage of the land, would throw the water more rapidly into the river than if it had sunk through in the ordinary way of soakage. The cutting down the trees would have exactly the same effect; the water would run off more rapidly instead of being held up in suspension as with a sponge. These causes, no doubt, would bring down the water more rapidly.

1429. Then will you be kind enough to inform the Committee of the courses of the flood, in your opinion, in addition to those points?—My opinion is that every weir and every lock is a practical obstruction to the flow of the river, and diminishes the section area of the river; while, in point of fact, what is wanted is that the sectional area of the river should be equal to carry the maximum quantity of water in the flood time, and now it is not. I will illustrate it, if you will allow me, in this way. If you had a barn, for instance, and a gutter round it, and it run over, you would send for your plumber, and he would say, "Oh, it is not large enough, and I must widen it and deepen it." He would put one up, and you would find that the water flowed with perfect ease. Later on you find that it flowed over in the middle; you would look, and find there was a stone there; that is a narrowing or a contraction of the sectional area; that is exactly so with the River Thames; all these locks are either more or less instruments to tank the water. They are very excellent and very useful as steps for the purpose of getting up the river, and very useful for the storage of the water in the summer, but they undoubtedly diminish the sectional area of the river in winter, and contribute greatly to the floods. Now this is a very singular thing; I can refer you to these

Chairman—continued.

Acts of Parliament, and in every one of these Acts of Parliament, old Acts of Parliament, provisions were made for prosecuting people who did not open the weirs and locks also. Now the locks are never opened, and the sills weirs are placed above the bed of the river, and the sectional area of the river at every lock and every weir is sensibly diminished. Now these are causes, and I say the way to get rid of those causes is this; if they were to ballast the shoals, and ballast many of the aits or islands in the river, and if the locks and weirs were made so as to open and new channels above each lock were made to be applicable and available in times of flood, then you would be able to get sufficient increase of the sectional area to carry off the increased quantity that came down in the winter time.

1430. Ballasting the shoals; do you mean dredging the shoals?—Yes, because the sectional area is increased there by deepening; it does not signify whether it is wide or deep, so that the sectional area is increased.

1431. Do you consider, then, that the Thames Conservancy, by neglecting to take the means such as you propose, have by their action tended to increase the floods?—When I say negligence I am not coming here to assert negligence; they plead a kind of *non possumus*; they say they have no money; they will not deny the fact; but they say they have no money, and that is what the old Commissioners said.

1432. That is another question; suppose the Thames Conservancy have been amply supplied with means, do you suppose that by reducing the width of their weirs, by dredging the shoals, by opening their locks, and by reducing the acts, they could improve the state of the river?—And by constructing at every weir or lock a channel for carrying off as much as they obstruct.

1433. Then you believe that the floods would be greatly diminished if not altogether obviated?—They would be greatly diminished. Have you taken a note, Sir, that in all these Acts of Parliament there are clauses imposing penalties for not opening the locks and weirs. It states in some of them what obstructions has been caused by floods caused by that omission.

1434. You had better give us evidence upon that point?—Yes, I should be very happy to do so. I have no hostility towards anyone; I only come here in the public interest. The 11 Geo. 3, c. 45, s. 7, says, the Commissioners may make regulations, and may "give such reparation, satisfaction, and damages to the person or persons aggrieved thereby, as likewise to the owners or occupiers of lands, meadows, or other grounds, who shall be damaged by the neglect or refusal of the owners of such pounds, weirs, bucks, winches, turnpikes, and flood-gates, in not opening and keeping open the same till the water is sunk beneath the watermark as to the said Commissioners, or any 11 or more of them, shall seem meet." That is in the Act of Parliament.

Sir Charles Russell.

1435. Is that operation now?—Yes, they are all in full force; they are all incorporated with the Act of 1866, and are all in full force.

Chairman.

1436. Not repealed?—Not at all. Now I will take you to another section, 21, which says, "The Commissioners are to order the district surveyor to



*Chairman—continued.*

to open flood-gates in case of an overflow," and then it goes on, "That it shall and may be lawful for any two of the said Commissioners upon the complaint of, and oath made by, the general or district surveyor, or by any of the occupiers of the meadows above, that the water runs over the water-mark, and that their meadows are in danger of being overflowed, to send under their respective hands and seals a warrant, directed to the said general or district surveyor, or to the constable or constables of the parish or place or some neighbouring parish or place thereby, authorising and empowering him or them to give notice of such complaint to the several tenants or occupiers of the said pounds, locks, weirs, turnpikes, dams, and flood-gates, and on their refusal to open the same to compel the said tenants or occupiers of the said pounds, locks, weirs, turnpikes, dams, and flood-gates to open and keep open the same, as occasion shall require, till the water is sunk below the water-mark, and no longer." That is the 11 Geo. 3, c. 45.

1437. Does it mention any penalty?—It says this: "And if any damage shall be sustained by the tenants or occupiers of such meadows, occasioned either by the occupiers or tenants of such pounds, locks, weirs, bucks, turnpikes, dams, and flood-gates, penning the water above the water-mark so as aforesaid set by the said Commissioners, or neglecting or refusing to open or keep open the same as aforesaid, after such notice as aforesaid, any three or more of the said Commissioners shall at any of their district meetings to be held as aforesaid, within the space of ten days next ensuing, on proof made on oath as aforesaid of the damage or damages, order such satisfaction as to them shall seem just."

1438. For the damage done?—Yes; and then the Commissioners acquired these pounds afterwards themselves, and erected a great many works which they were prohibited from erecting. Now I will take the next Act of 15 Geo. 3, c. 11, s. 4, which states: "And whereas by the said Act of the eleventh year of his present Majesty's reign, the Commissioners are empowered to fix a mark or marks at each lock or weir, below or above which mark or marks no owner or occupier of any lock or weir shall knowingly or designedly let the water fall or rise, unless authorised so to do, in manner directed by the said Act. And whereas since the passing of the said Act great damages have been sustained by the owners and proprietors of lands and grounds, occasioned by the owners and occupiers of the several locks, weirs, bucks, and flood-gates, on their agents and servants neglecting to draw and keep one the same when the water is risen to the guage and level fixed and appointed by and under the authority of the said Act." Then it goes on to say, "Be it therefore further enacted by the authority aforesaid, that when and so often as the water shall be raised to and be level with the high-water marks, which shall from time to time be set and appointed by the Commissioners in pursuance of the said Act of Parliament, the tenants or occupiers for the time being of the several old locks, weirs, bucks, dams, and flood-gates in and upon the said rivers, or either or the person or persons who for the time being shall be intrusted with the opening and shutting of the same, shall thereupon, with all convenient speed, open such old locks, weirs, bucks, dams, and flood-gates, and keep open the same till the water is sunk below the high-water marks so set

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*Chairman—continued.*

and appointed; and in case such tenant or occupier, or person intrusted with the opening and shutting of such old locks, weirs, bucks, dams, or flood-gates, shall neglect or refuse to open or keep open the same as aforesaid, and shall be thereof convicted upon the oath of one or more credible witness or witnesses, before one or more of his Majesty's justices of the peace for either of the counties in which such old lock, weir, buck, dam, or flood-gate shall happen to be, or before any two of the Commissioners appointed or to be appointed in or by virtue of the said Act." And then in default of their so doing, there is a penalty of 10*l.* imposed; therefore there are three Acts of Parliament, all alleging or assuming what I have stated.

1439. What is that last Act?—The 15 Geo. 3, c. 11, s. 4. Now I come to another Act of Parliament, which is in force: "And whereas doubts have arisen whether the rise of water and overflowing of the lands has been occasioned by the penning of the water at the weirs, or by the ditches and drains not being properly scoured and opened; be it therefore enacted, that it shall and may be lawful for the said Commissioners, at any of their general meetings, on the information and complaint in writing of any person aggrieved by such overflow, to issue their warrant, if they see just cause, to the sheriff of the county in which the complaint shall arise, to summon a jury in the same manner as directed by the said recited Act of the eleventh year of his present Majesty's reign to inquire, ascertain, and settle what damages have been done by such overflow, and whether the same hath been caused by the penning the water at the weirs, or by the ditches and drains not having been properly kept open, and on the verdict of the said jury it shall and may be lawful for the said Commissioners to adjudge and order the damages so found, with reasonable costs, to be paid by the party having caused such damages to the party aggrieved, and in default thereof;" that is the 28 Geo. 3, c. 51, s. 19. Now I come to the 35 Geo. 3, c. 106, s. 22: "And be it further enacted, that if any person or persons shall think himself, herself, or themselves aggrieved, damaged, or injured by any work made by the said Commissioners, or by the operation or effect of any such work, and shall make complaint thereof in writing to the said Commissioners at any district meeting, or at any general meeting under his or their hand or hands, the said Commissioners shall hear and report on such complaint to the next or some other subsequent general meeting, and at such next or subsequent general meeting the said Commissioners shall make such order, determination, and judgment thereon as to them shall seem just;" and, if the party is dissatisfied, there is an appeal to the quarter sessions. Now, generally, these clauses point to a particular fact, namely, that these weirs and locks did obstruct the flow of the water, and did tend to damage the land by floods. Now, there was a clause under the Act of the 35 Geo. 3, prohibiting the Thames Commissioners, the old body, the defunct body, from erecting any lock or weir between Boulter's Lock, above Maidenhead Bridge and the London Stone at Staines. They subsequently got another Act of Parliament passed, that is the 35 Geo. 3, c. 106, s. 3, prohibiting them from doing it without the consent of the city authorities. Well, they got authority

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afterwards to make certain alterations, and to build certain works, and they did actually construct between Boulter's Lock, above Maidenhead Bridge and the City Stone, Bray Lock and Weir, Boveney Lock and Weir, Windsor Lock, and Old Windsor Lock and Weir, the Bell Lock and Weir (that is at Egham), so that, in point in point of fact there are five; I am not indicting the Conservators, but the old Commissioners did that.

1440. In spite of the existence of the Acts of Parliament?—No, these were constructed with the consents referred to; and all these, I say, tend to diminish the sectional area of the river, and tend to cause floods.

1441. Now, you say that this Act transferring the power of the old Commissioners to the Thames Conservancy was passed without the knowledge of the authorities of Windsor?—It was so; it was a fact they had no power to oppose out of the corporate funds if they had known the character of the Bill.

1442. You have also stated that the powers under which they acted inflicted penalties for certain things, for not opening locks under old Acts which were not repealed by that Act of 1866?—Those are all incorporated with that Act.

1443. And not repealed?—No, they are not repealed.

1444. I presume that this came under the notice of the Corporation that the Thames Conservancy, at the times of floods, have not opened these weirs or locks, and therefore have subjected themselves to penalties; is it so or is it not?—Well, I will tell you what it is, it is as well to be frank with you.

1445. If you please; that is what we want?—The Borough of Windsor does not desire to quarrel with the Thames Conservators, because they have some drainage works, and they can impose a penalty of 50 *l.* a day upon them.

1446. Then, in order that the Thames Conservancy should not inflict a penalty of 50 *l.*, they have taken no notice of this?—I do not say that. I say we do not want to place ourselves in a position hostile to the Thames Conservancy, and have never mooted the question.

1447. However, that operated on the minds of the authorities of Windsor in some shape or way, but the authorities of Windsor have not sought to enforce the opening of the weirs?—They have not, and I am sure they were ignorant of the provisions of the private Acts I have mentioned.

1448. You have alluded to the drainage works?—Yes; they are sad things.

1449. Are these drainage works yet completed?—No, they are going on now.

1450. They are in progress?—Yes, and an exhaustive business it is, too.

1451. What amount was the Corporation of Windsor prepared to expend upon the drainage works?—I cannot say, nor is it known.

1452. Have you not any contract for the works?—There are contracts, but what the works will come to no one seems to know.

1453. But you must be aware of the amount of the present contracts?—I think they are about 40,000 *l.*, and we must capitalise expenditure to the extent of about 1,500 *l.* a-year, which would be equivalent to about 30,000 *l.* or 40,000 *l.* more, and I believe it will cost above 60,000 *l.* It is in this way; the pumping will cost about 600 *l.*

Chairman—continued.

a-year, the deodorisation, for it is not a sewage farm, will cost, according to the evidence of the engineer, 912 *l.*; that is 1,500 *l.* a-year. If you capitalise 1,500 *l.* a-year, you must treat that as the actual sum, and putting that at 4 per cent, it will be 80,000 *l.* on the works, and I believe it will come to 100,000 *l.* I never knew works to be done within the contract.

1454. Who was the engineer who advised you?—Mr. Hawksley; he is making an outfall sewer with large tanks; I have nothing to do with that part of the business; I do not think they will answer, but that is another thing.

1455. Has he advised a system of deodorising in consequence of your having no farm, or has it been under the consideration of the authorities who have the sewage farm?—He says, "I am obliged to make an outfall sewer, but I am not a chemist," and he has thrown all the responsibility on the local authorities as to the difficulties which will some day arise; he proposes no farm, but precipitation tanks.

1456. The local authorities have taken the responsibility upon themselves?—The authorities rely entirely upon him.

1457. What becomes at present of the sewage of the town of Windsor?—It goes into the river.

Mr. Samuelson.

1458. And I suppose we drink it?—These organisms that we hear of may be some of the Windsor organisms for aught I know.

Chairman.

1459. In what period do you expect your works will be in a measure complete?—I should think another year will complete them.

1460. You do not know what process of deodorising has been adopted?—That is not at all determined upon.

1461. Are you aware of any system of deodorisation that can be relied upon?—No, I am not aware of any; you may deodorise, but you cannot do away with the soluble portions of these matters, because the particles of which they are composed are so small that they will pass through any filter. If matter is soluble, and particles of it no larger than the particles of water, it will pass through exactly the same filter as water will.

1462. Is there not chemical precipitation?—You do not get at these portions that are in solution; you may try them, but you will not get at any that are in solution.

1463. I understand you are laying out 40,000 *l.*, and incurring a cost of 1,500 *l.* a year, and by means of deodorising you propose to treat your sewage, and allow your effluent water flow into the Thames?—Yes.

1464. And you say that many means may be taken for obviating floods; but up to the present time the authorities of Windsor have not taken any action, as regards the Thames Conservancy, upon that point?—No, they have taken no steps.

1465. Do the floods come into any of the houses at Windsor?—Yes, they do, many of them.

1466. But the authorities have not, as yet, taken any action?—Well, they took a very active part in getting a deputation to wait upon Mr. Cross with the view of getting an inquiry into the matter of floods, the other day; the Corporation of Windsor were the moving body in that matter.

1467. And

*Chairman*—continued.

1467. And the authorities of Windsor co-operated with the Thames Floods Prevention Society?—Just so; we invited them to come with us. They went to the Conservators; I did not approve of that policy. I said, "You will have a *non possumus*, and when they went there that is exactly what they did have. We went to the Home Department, and we got what we wanted.

*Admiral Egerton.*

1468. What was that?—An inquiry. I believe this Committee is sitting here to day, probably, in consequence of what the honourable Member moved in the House, caused no doubt by that deputation, which was very influentially composed, consisting of many Members of Parliament, the Dean of Christchurch, and many representatives of the riparian towns and counties.

*Chairman.*

1469. You have mentioned several works which ought to be carried out to reduce the floods?—To increase the sectional area, and thereby reduce the floods.

1470. And you believe that it is owing to the want of funds on the part of the Thames Conservancy, that these things have not been done, in a measure?—Well, I should qualify that in this way: I think a body, living in London, are not so exactly the parties who ought to administer the affairs of a navigation connected so much with agriculture, and, therefore, although that body is a very honourable body, quite fit to manage anything connected with the metropolis, and everything that is urban connected with this water, I think myself that the agricultural interests being so largely affected, it ought to be very largely represented on the Conservancy.

1471. Then would you kindly inform the Committee of the kind of body you would like to see that should have the jurisdiction over the Thames, and that could carry out the different works of navigation, drainage, exclusion of pollution, and prevention of floods?—I think it is possible, if you had 15 members elected, members from the various towns, or some representation of the local bodies. I think that the mayor of every riparian town, from the Stains Stone to Oxford, ought to be a member, and that the riparian counties ought to be represented also, and they ought to form, with the Thames Conservancy, a Board. No one can complain then that his interests are not protected and looked after.

1472. I suppose where there are riparian towns without mayors, you would not object to the Chairman of the Local Board?—The urban sanitary authority.

1473. That we will come to afterwards. Have you thought what would be a convenient number to form this Board of Conservancy, or body of Commissioners, or whatever you may call it?—I should have thought in a matter of the nature of this navigation, seeing that a portion of it is quite commercial, and the residue of it is local, that the Board of Conservators would have divided themselves into two committees, so to speak, having one to look after one portion, and another to look after the other, so that they would be working harmoniously, and yet each taking its separate duty.

1474. Would you prefer that there should be one paramount body, with two or three com-

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*Chairman*—continued.

mittees to take certain portions of the river?—I think that could be done. I do not expect that persons in London who come up in a great barge once a year, can tell anything about the wants of the navigation.

1475. Do you object to the present constitution of the Thames Conservancy with the addition of every mayor of riparian towns, and every chairman of the urban sanitary authority where there is no corporation?—And some one representing the land; the counties.

1476. There are at present four?—There are four; they would be merged, of course.

1477. How many would you make them?—I should make them 15 altogether, and equal in number to those representing the London interest.

1478. Fifteen in addition, including the mayors, and so forth?—No; if you have too large a commission, you would not be able to work it.

1479. At present there are 23, and you would like to add 15 more?—I should like to add 15 more.

1480. That would be 38?—Yes.

1481. We must first of all constitute our Board, and that is what the Committee are desirous of considering. I understand you to say that, in addition to the present 23 members, you would have 15?—Or else I should reduce the number of the other Conservators, and add an equal number of the others. I want to have the agricultural interest fairly and properly represented at that Board.

1482. And the number that presents itself to your mind is 15?—I am not particularly desirous of 15, or any other number, so that there is a clear and equal representation of the towns and counties that are flooded and affected upon that Board, either by reducing the members of the present Board, or increasing them, as you have just mentioned.

1483. Supposing there to be a body constituted to your entire satisfaction in the way that you represent, would the town of Windsor then be prepared to contribute in the shape of rates to the works necessary to be done?—That is another matter altogether.

1484. Exactly?—I will tell you exactly how I think that ought to be done; to tax one man for the benefit of another when he derives no possible benefit himself is wrong.

1485. I particularly inquired of you, I think, whether any of the houses in Windsor were damaged by floods, and I understood you to say that they were?—Yes; that is only a small portion of the town but containing many small houses.

1486. The town of Windsor, therefore, is, in a measure, I will not say in what degree, affected?—In a very small portion, and then that portion which is affected should be taxed.

1487. Suppose that these works are carried out effectually, and economically, will the part of the town of Windsor affected by floods be willing to contribute its fair proportion to the rates?—I have no doubt whatever with regard to that portion of the borough of New Windsor (which is a small portion of the borough), which is seriously affected by floods, the owners of property would willingly contribute to an assessment for protecting their property from the floods; moreover, I believe that all the riparian landowners would be very glad to do the same; I think there are at least from 100,000 or 130,000 acres of land that

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that are, in flood time, under water; taking the average value of the land at 2 l. an acre, it would come to something like 260,000 l. of taxable value; if you taxed the whole of that up to 2s. in the pound, and no more, you could have a redemption fund, and find all your money. Now, you will ask what will the landowner say to that? I was speaking to a very large farmer the other day, whose land is affected by floods; I said, "Do you suffer much from floods?" and he said, "Yes, a great deal; I have lost 600 l. or 700 l. this year through the floods." I said, "It is a very serious thing; would you object to be taxed to something like 2s. in the pound upon your lands?" He said, "If I was protected from the floods, I would give 10s. an acre more for my land."

1458. Perhaps you are not aware that the upper Thames Commissioners have adopted a system of taxation by which the Board of Ordnance have made a survey?—Yes.

1489. They have got a line, and all land five feet above water mark is rateable?—Well, I do not know how that will work out in practice.

1490. Will you kindly answer my question; suppose that plan to be adopted throughout the river, would the Windsor people, landowners, householders, and others, be willing to contribute their fair share?—I think they would cheerfully contribute to be taxed for the benefit they would derive from the floods being prevented; I am speaking in the presence of one of the largest proprietors in Windsor, the honourable Member, and I am not far wrong there.

1491. The honourable Member will put questions to you afterwards. Then I gather that, with a board constituted to your entire satisfaction, the town and neighbourhood of Windsor would be willing cheerfully to be rated for the fair share that would fall to them for works carried out fairly and economically?—Yes. I have no crotchet about it, you know. I wish it to be distinctly understood that I live in the portion of Windsor which is high and dry; I am out of the floods, and I should not like to contribute to a taxation for the relief of those who are in the floods. You only mean by the question, I presume, to say, would the people who are subject to these floods submit to taxation to be relieved from the floods?

1492. In the way that is defined by the Drainage Commissioners, that is, five feet above high-water mark?—As I said before, I am not sure how that would operate; I think it would be a better plan to have a survey made of every portion of the land which has been affected by the floods within a given period. That would give it to you without that line. I doubt that line exactly.

1493. At all events we have one system, and it is obvious that everyone desires to receive the benefit of these works, and not to be taxed for it?—Yes, of course, if he found that he had more acreage taxed than came within the five feet, which was really never flooded, he would appeal from it; no doubt there would be an appeal in cases of that kind.

1494. Can you give any better system of division of area of rating than that adopted?—It must be either by survey or levelling; one or the other.

1495. That is got by survey?—It could be got by levelling. In our country I could tell every acre of land that has been under water; and the farmers could point them out, to an inch, to the

Chairman—continued.

surveyor; so that you could have a survey all up the river, showing all the taxable area.

1496. You are aware that that has been done in the upper part of the river, and the line of demarcation has been laid down. Have you any other system which you think would be an improvement upon that?—No. So that you can get to know the people whose property is flooded, and tax them *pro rata*, I think it is equitable; they get the benefit, and they ought to pay.

Sir Charles Russell.

1497. Is it your opinion, taking the river as it stands, without any alteration in the weirs and the locks, that by a more rapid and careful opening of the gates of the weirs and of the locks, and by compelling the millers to carry out that which you say they could be forced to do by means of an Act of Parliament; do you think that some considerable relief to the floods could, even in the *status quo*, be afforded?—If the sills of the weirs were altered, and the weirs made more easily removable during the floods, and the lock gates were made to open, I believe that would greatly mitigate the floods.

1498. You told us there were five new locks erected?—Not new, but since the Act I referred to.

1499. Yes; I know it was about 40 or 50 years ago. Were those put up, in your belief, for the purpose of the navigation purely; I believe they were put up for the purpose of the navigation because of the shoals; in dry weather the river was fordable; you could walk across it, and therefore they put up these on purpose to get up steps, to tank the river, and it answered in those days, because the traffic was large.

1500. And it is also, I suppose, useful in keeping a better body of water in the river in summer?—Oh, certainly. Tanking a river is very useful in summer.

1501. Have you any knowledge whether it is true that any of the millers have raised their water mark; that is to say, that the old water mark is not now what the mills are working to?—I daresay it may be so.

1502. It was lower?—I think it is very likely. Millers, no doubt, have a very acute knowledge of their own interests.

1503. But of your own personal knowledge, you do not know?—I would rather not give an opinion upon that point.

1504. Has it ever been suggested to you, as one of the means of raising a further revenue, that there should be a small tax placed upon the pleasure boats. I know that the town of Windsor does an enormous deal of boating, and it has been suggested that one way of obtaining more revenue would be that?—I very much doubt whether you would increase your revenue by it; I think that heavy taxation frequently results in smaller receipts.

1505. I am not assuming a heavy taxation, I am assuming a very light one?—A slight increase these pleasure boats pay now I believe.

1506. Only in going through the locks?—Yes, that is what I mean. You mean to tax people keeping them on the river.

1507. Yes?—I do not know about that; you are interfering with the common law rights; the river is a public highway.

1508. You tax a carriage?—It is a matter of opinion entirely; but I do not think it would be popular at all.

1509. In

Sir Charles Russell—continued.

1509. In fact, it appears that no mode of taxation is very popular?—No one likes taxation.

Sir Trevor Lawrence.

1510. With regard to these Acts that you have referred to, which impose penalties; in the course of your duties have you ever considered the subject of enforcing those penalties?—I never heard of their being enforced, and never until I looked up the Act recently, did I ever trouble my head about it. I was asked to give every information I could to this Committee, and I took the trouble to go into that, on purpose to let the Committee know.

1511. Because it would appear that it is your opinion that these serious impediments in the river are the cause of floods, and also of injury to a portion of the town of which you are town clerk, and it would appear to have been an obvious thing for you to have advised your town authorities to enforce the Act?—These Acts of Parliament are so badly drawn that if you look at the clauses you will see there would be very great difficulty in enforcing them. The spirit of them is in the Act of Parliament, but when a person is to judge himself of what he is to pay you, I should like to know what tribunal that is to go before. Then it assumes another thing, and I cannot quite ascertain how that is. It assumes by these Acts that the old Commissioners let the pounds to people, or that the pounds were private property, belonging to millowners, and I believe they did, and that therefore they could enforce it against these people who were contravening these Acts; but as they became large pound-holders themselves and weir-holders, of course, then if you had to enforce the penalty against them personally, and they were persons to be judges, it would be very awkward. I have never been consulted by the corporation on the subject.

1512. In this case it appears, as I understand from you, that you were not aware of these provisions, and therefore, if they had been the most practicable provisions that ever existed, they would have been of no service?—I should not have troubled about them if not asked to advise on them.

1513. Therefore, in the event of a further Act being passed, and provisions of this nature being introduced, it seems doubtful whether anyone will pay attention to them?—A farmer came to me, I recollect now, and we looked into the Act of Parliament, and I said I thought they were liable; that was during the present year.

1514. You have criticised the way in which Acts of Parliament are allowed to pass, and I daresay very justly; but it also appears that there is a certain amount of laxity in the way in which they are made use of by the public?—No one likes litigation; I never knew of a person who liked litigation.

Mr. Samuelson.

1515. Would there be the same difficulty with respect to the erection of weirs which you say is forbidden, that there is with regard to the alterations which have been made or misfeasances of other kinds?—I do not quite understand your question.

1516. You say that certain locks have been erected in contravention of Acts of Parliament?—No; because subsequent Acts of Parliament

Sir Trevor Lawrence—continued.

passed authorising them with certain consents; and at one time they were prohibited from Boulter's Lock down to Staines Stone; and afterwards with such consents they were constructed, but at that time it was assumed no doubt that locks were an obstruction.

1517. You only mentioned that in order to show that locks were at that time considered to be obstructions?—They must have been, or there would not have been the clauses I have mentioned.

1518. And that you also state as your opinion?—I have no doubt that they contract the sectional area of the river, and *pro tanto*, contribute to the floods.

1519. Is there the same difficulty in proceeding against millowners as there would be against the Thames Conservators?—The Conservators ought to act. I have seen a great many things connected with public law, and I have found that no one likes to be a public prosecutor unless it is his business. There is something obnoxious in the idea; they are looked upon as informers, and people will not involve themselves in voluntary litigation.

1520. Therefore you think that the only remedy is that the interests affected should also have the control?—I think that the administering body ought to enforce the law.

Mr. Richardson-Gardner.

1521. The Thames Conservancy, in accordance with the order of the House of Commons, lately made a report with regard to the inundations of the Thames; I do not know whether that report has come under your notice?—I heard it mentioned by Mr. Sclater-Booth, that is all; I have never seen it.

1522. In that report I may inform you that they state there have been only four severe floods from 1821 to the present time?—I know that is incorrect.

1523. Now, within your knowledge, living so many years as you have done at Windsor, and having given so much attention to this subject, will you kindly inform the Committee (for this is a very important element of the inquiry) as to the recurrence of the floods, and the number of times generally within that period you think they may have occurred?—More or less there is a flood every year, but it is not of the same dimensions. Sometimes it is a very serious flood, sometimes it is not, but every year I will undertake to say that the towing path is not passable at certain periods. We know very well, by what is called the Cobbler, at Windsor, how the water rises, and it is frequently over the Cobbler.

1524. And when it is over the Cobbler, does it come into the houses?—No, but the river is very full, and it overflows its banks.

1525. Within your knowledge, comprising nearly 40 years, can you give us any information as to the number of times that there have been floods, which have entered the houses of the inhabitants of Windsor, generally; I do not bind you to any particular number, but more or less?—Until the last 20 years there were no houses in Windsor that were built within the flood-line, they have been built within the flood-line since, and during the last 20 years I should say that I have known them flooded three or four feet, or two feet at all events in their houses, making them uninhabitable; that has occurred six or seven times.

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1526. Within

Mr. Darvill.

15 June  
1877.



Mr. Darvill.

15 June  
1877.

Mr. Richardson-Gardner—continued.

1526. Within the last 20 years?—Yes, if not more; I believe it to be more.

1527. When you say that the houses within the flood-line have only been flooded within the last 20 years, as an old inhabitant of Windsor, you know that it is bounded by the Castle on one side, the park on the other, and the river on the other, so that there is no other available space for building purposes?—Yes, that is so.

1528. I would ask you with regard to the composition of the Board which you suggest. You mentioned the mayors of town. Now, with every respect for the mayors of towns, and believing that they would be highly intelligent and competent persons to be on the Board, still they are only elected annually, and, therefore, probably would hardly get sufficient knowledge of the position of things in a year; and just when they got into action they would be out of action again?—There is a difficulty in that respect; but you see they are representative people; they would speak the views of their councils; they would be in point of fact persons who represented other bodies, and they would know therefore the views entertained by those bodies, and the wishes and desires of those bodies, and they would know also the injury that was sustained by persons in those towns.

1529. Perfectly so; but they are only annually elected, and they would go off this Board after they had been on it one year?—Yes; but a Board of this description always has officers, engineers, surveyors, and so forth; they make a report, and you must act according to your scientific man's report. The ways and means might be seen to as well, probably, by a man who had been on the Board only one year as one who had been

Mr. Richardson-Gardner—continued.

on it six or more; he could see to the mere raising of the money, for, after all, it would come to a question of money.

1530. I thought, probably, some officer of a borough might be appointed?—I quite agree with you that a fluctuating body of that kind has its advantages, no doubt it has; but I want to make it representative, so that the whole of the towns shall have a voice in the administration of the river, and also in the taxation of those towns for the large sums which will have to be contributed.

1531. The chairmen of the local boards are permanent, are they not?—Yes, pretty much so, but they go out periodically.

Sir Trevor Lawrence.

1532-3. They are eligible for re-election?—Yes.

Mr. Richardson-Gardner.] It was simply to get a more permanent character for the representatives of the Upper Thames that I made this suggestion; they would be more permanent than mayors, because mayors only exist in office one year, unless re-elected.

Chairman.

1534. With reference to the question of the honourable Member for Windsor, perhaps it would meet your views if some member of the corporation should be elected?—That would do equally well.

1535. That would meet your view as well?—Quite as well, so that we get someone to represent each town, and that there may be a fair and honest representation.

Mr. WILLIAM HOOD, called in; and Examined.

Mr. Hood.

Chairman.

1536. You are the Mayor of Reading, I believe?—Yes.

1537. For how many years have you been a member of the corporation?—This is my ninth year.

1538. Part of the town of Reading abuts on to the river, I think?—The River Kennet runs through the town of Reading; the Thames does not abut upon the town, but it is a little distance from it; in fact, forms the northern boundary of the borough.

1539. Then where is the junction of the Kennet with the Thames?—A little on the east side of Reading.

1540. Does the Kennet frequently overflow its banks?—Yes, almost every year, more or less.

1541. And do the floods reach the houses in Reading?—Yes; but that is more particularly from the Thames floods.

1542. I understand from you that the Kennet flows through the town?—Yes.

1543. And the Kennet is flooded annually?—Yes.

1544. But the floods of the Kennet do not reach the houses?—Very partially so, I think; not much. The floods in the Thames affect some new property, which has been built within the last 20 years, and inundate the houses there.

Sir Charles Russell.

1545. What part is that?—Near the Caver-

Sir Charles Russell—continued.

sham-road, Great Knolly's-street, between the embankment of the Great Western Railway and the town, near the slaughter-houses; in fact the market and fair ground is all covered with water when the floods are high.

Chairman.

1546. Do you consider that the floods in the neighbourhood of Reading inflict injury upon the property?—The property in the town that is submerged, of course is very much injured by it, and the meadow land between the town and the Thames, of course, is also injured, I suppose.

1547. If means could be provided for obviating or greatly diminishing these floods, would the town be willing to contribute in the way of rates for such an object?—That is a question I can hardly answer. The town has been put to such considerable expense in draining, and getting a farm for irrigation, that I doubt the advisability of taxing them further for any purpose.

1548. You are not enamoured of rates in the town of Reading?—No; we have expended something like 240,000*l.* in draining the town, and purchasing a farm for the purpose of irrigation, and a pumping station, and everything connected with it; therefore the rates in Reading are exceedingly high.

Sir Trevor Lawrence.

1549. Are the works in operation?—Yes.

1550. And

*Chairman.*

1550. And you have expended 240,000 l. for drainage, and have made an irrigation farm?—Yes.

1551. The effluent water from the irrigation farm, I presume, flows back into the river?—It flows into the Kennet.

1552. Are those drainage works working satisfactorily?—They are during the summer months, but during the flood time of course they are not so. Our drains get inundated, and get filled with the flood water.

*Chairman—continued.*

1553. Do the floods reach the irrigation farm?—Yes, the floods of the Kennet reach a portion of it, our irrigation farm is on the banks of the Kennet, not the Thames.

1554. By that means the sewage which is upon your irrigation farm, occasionally, in floods, goes back into the Kennet?—Yes.

1555. And from the Kennet, I am afraid, into the Thames?—Yes.

*Mr. Hood.*

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Mr. HENRY DAY, called in; and Examined.

*Chairman.*

1556. You are Deputy Town Clerk of Reading?—Yes.

1557. How long have you been in that capacity?—About 4½ years. I was under the Local Board of Health a year before that, and have been connected more or less, in a subordinate way, with the town business for the last 20 years or more.

1558. Has the question of the floods in the Kennet and Thames, in the neighbourhood of Reading, been brought to your notice?—Yes.

1559. And have you paid some attention to the matter?—Some attention.

1560. Do you consider that these floods are injurious to property?—Well, not to the extent to which they are to some towns. There are, perhaps, some 200 houses more or less affected by the floods, but only, perhaps, 40 or 50 which have been actually inundated by the recent heavy floods.

1561. Your town has been very heavily taxed, as the mayor has told us, for drainage purposes?—Yes.

1562. Arising from the action taken by the Thames Conservancy almost immediately after the passing of the Act of 1866?—Yes; I may say with reference to that Act that it was strongly opposed by the Local Board of Health of Reading. They also endeavoured to get inserted into the Act clauses for the purification of the River Kennet, from which the water supply of Reading is taken, similar to the purifying clauses, if I may so term them, of the Thames Navigation Act, 1866, as regards the Thames. They did not succeed in this effort.

1563. You are speaking now of the Thames Conservancy Bill of 1866?—Yes. I think it was upon the urgent representations of the then clerk to the Local Board, Mr. Rogers, when the Act of 1866 was passing through Parliament, that the Government undertook to increase the facilities of local boards for the acquisition of land, for the disposal of sewage; and I think the Sewage Utilisation Act of 1867 was probably the outcome of representations made by Reading upon this occasion to the Government. That of course did not deal at all with the question of the removal of obstructions from the river or the other questions which are before this Committee, which are of considerable importance to the town of Reading, in connection with the works which they have since been called upon by the Thames Conservancy Board to execute.

1564. You had no difficulty in finding out that this Bill was passing through Parliament?—Well, I presume notice was taken of the usual

*Chairman—continued.*

Parliamentary notice in the newspapers. I take it, that was the mode by which it was ascertained.

1565. In the ordinary way?—Yes. I think one of the reasons of the corporation for opposing that Bill was, that more stringent restrictions were placed upon the towns and the authorities situated upon the Upper Thames than the towns and authorities on the Lower Thames were subjected to. I think you will find on reference to the Thames Conservancy Acts 1857 and 1864, and the Act of 1866, that the Upper Thames is under more severe restrictions than the Lower. Probably the diversion of the sewage from the Upper Thames was the benefit in respect of which the London water companies consented to pay the Conservators of the Thames the sum of 5,000 l. a year, as provided by the Act of 1866. Whether that is an adequate sum for the benefit they gain by the purification of the river, I am not prepared to say, but it is thought that, inasmuch as that contribution was a kind of premium for the benefit obtained by the purification of the river from sewage, it ought to be applied in the removal of obstructions and in the improvement of those portions of the Upper Thames which are subjected to the operation of the Thames Navigation Act of 1866.

1566. Suppose a Board were constituted for the jurisdiction and management of the river in which the riparian towns, and especially the town of Reading, should be fairly represented, would Reading be prepared to contribute for the purposes of the works to be carried out for the prevention of floods, presuming that the town of Reading had also a fitting portion of the amount contributed by the water companies to relieve its rates?—I am not authorised by the corporation to speak upon that subject; but I think, I may say, that the town would seriously object to any increase in respect of taxation in respect of the River Thames, seeing that the taxation to which they have already been subjected amounts to something like 2 s. 6 d. in the pound per annum, in respect of works of drainage and sewerage and works connected therewith, which have been carried out in consequence of the action of the Conservancy Board, on the passing of the Act of 1866.

1567. That is an amount which has been caused by the action of the Thames Conservancy?—Speaking roundly, that is the amount. I believe the town would consider that was quite the maximum amount to which they ought to be subjected.

1568. Some of the roads in your neighbourhood, I believe, are below the level of the floods in the Thames?—Yes.

*Mr. Day.*

1569. And



Mr. Day.

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*Chairman—continued.*

1569. And do the flood waters thereby enter into the gratings and ventilators of the low level sewers?—I am not so cognisant with this as the engineer or the borough surveyor would be, but I know generally that it is so.

1570. In fact, you find that there are great difficulties connected with the disposal of your sewage, notwithstanding this immense outlay?—Very great. I should have said that the jurisdiction of the Conservancy Board, as far as Reading goes, does not stop at the mouth of the Kennet, but extends into the town to the extent of about a mile. I mean the regulation and management of the River Kennet to this extent; this is provided for by section 21 of the Act 24 Geo. 2, cap. 8, one of the Upper Navigation Acts.

*Sir Trevor Lawrence.*

1571. Have you the Act there?—Yes.

1572. With regard to this sewage farm that

*Sir Trevor Lawrence—continued.*

you have, which is partly flooded by the Kennet, was there no higher ground upon which you could make it?—I may say that the farm was purchased under special Parliamentary powers, and after a very strong opposition in both Houses of Parliament. The special Act giving power to purchase the farm is the Reading Local Board Waterworks, Sewerage, Drainage, and Improvement Act, 1870.

1573. I suppose it is only a very small portion of it that is subject to floods?—During the last two heavy floods it has been flooded to the extent of some 400 acres, owing chiefly to impediments in the river, and obstructions along its course, between the sewage farm and the outfall.

1574. Then the only hope is that, owing to the copious dilution of the sewage, the floods become comparatively innocuous?—We are doing the very best in our power.

Mr. WILLIAM DONALDSON, called in; and Examined.

*Chairman.*

Mr.  
Donaldson.

1575. You are the Engineer employed by the Corporation of Reading?—Yes; I carried out the main drainage works under Messrs. Lawson and Mansergh, and since their completion, I am now acting as engineer in finishing up and laying out the farms, and carrying out some waterworks extensions.

1576. I believe you have had some considerable difficulty in carrying out those works?—There has been very great difficulty indeed. Through the town of Reading the channel of the Kennet is very tortuous; it is blocked up by some very contracted waterways, and is very shallow in some places. These obstructions caused the floods to rise so high as to necessitate stoppages of the contract works, especially of the work of deepening and straightening the channel of the Kennet above the town.

1577. And your irrigation farm is occasionally flooded?—It was flooded during last flood.

1578. Has it been flooded before?—The greater part of the land purchased for irrigation is low lying land, which always used to be flooded, in even ordinary floods. Above Reading we have lowered the bed of the Kennet three feet, and improved the course up as far as the farm; but we are blocked when we come to the town; we only got our Act for improving it as far as the town; there we are blocked, and the land may possibly be subject to occasional flooding until the channel of the Kennet through the town has been improved.

1579. It requires lowering throughout the whole town?—Not lowering, but the course must be straightened and widened. There is a bridge which belongs to the Thames Conservancy which is a very great obstruction; it is nick-named "Silly Bridge," and rightly nick-named so; that is within the jurisdiction of the Thames Conservancy and ourselves.

1580. It is an old bridge?—Yes.

*Sir Charles Russell.*

1581. Which bridge is that?—The Watlington-road bridge over the navigation cut.

*Chairman.*

1582. You have an Act of Parliament?—We

*Chairman—continued.*

have carried out the works so far as we could under that Act, but we have no powers to improve the river through the town.

1583. Do the powers of the Thames Conservancy extend along the Kennet, through the town of Reading?—About half way through the town up to above this bridge.

1584. Do you consider it would be an advantage if the Thames Conservancy had jurisdiction over the whole of the Kennet?—Well, if they would spend money upon improvements it would. It would be an advantage that some one should have jurisdiction over it who had the power to spend money, and had money to spend.

1585. We are supposing that the Thames Conservancy was willing to spend money on the Kennet for the advantage of the town of Reading; would the town of Reading be prepared to be rated for that?—I would rather not say anything about that; it is not a question within my jurisdiction at all.

1586. Last year the irrigation farm was flooded, was it not?—Yes.

1587. And the consequence was that the sewage on a portion of it was carried back into the Kennet?—Yes, that was so. The flooding of the land can be effectually prevented.

*Sir Charles Russell.*

1588. At no very great cost?—No very great cost.

1589. Would you mind hazarding a figure?—I think 12,000 *l.* would do.

*Chairman.*

1590. Supposing no steps are taken to prevent floods in the Kennet Valley, may great injury arise to the town of Reading?—There will be a great difficulty in the way of disposing of our sewage in the time of floods.

1591. But I mean in a pecuniary and sanitary point of view?—In a sanitary point of view, as regards the disposal of our sewage in the meadows above, of course if those meadows get waterlogged for a length of time, the continuous flooding would have an injurious effect on the health of the town below, but the houses in the town

*Chairman*—continued.

town of Reading are only flooded by very exceptional floods, and only a very few of them by Kennet floods; I mean house property suffers most from the Thames floods.

1592. Is the land in the neighbourhood of Reading injured or benefited by the floods?—It is mostly meadow land. There is some arable land on the Caversham Meadows, which, no doubt, is very much injured. I do not suppose the meadow land would be injured by floods of short continuance, but the meadows above Reading were very much injured, because the floods used to linger on them the whole of the winter, but now they go rapidly off.

1593. When the meadows are flooded, I suppose there is a liability of the manure being carried into the river?—If we cannot cure the flooding, the sewage will be only partially purified before it goes into the river; that is all I can say about it; but it is only in these exceptionally high floods that the land would be covered.

1594. Is the effluent water tolerably bright and clear?—Yes.

1595. And free from smell?—Yes, we have got 90 acres of land laid out and prepared for irrigation now. They are going to lay out 164 acres this year, and that 164 acres lies upon this land, which has been liable to flooding during these heavy floods; it is upon the lower ground.

*Sir Trevor Lawrence.*

1596. That is with regard to the level to which you pump the sewage?—Yes, it is meadow land on the banks of the Kennet; but I do not think, from the experience I have had there, that we shall ever have it covered with water except in such floods as the one of last year, and I do not think they have had such a one as that for 40 years.

*Chairman.*

1597. It was quite an exceptional flood?—Quite an exceptional flood. It is a peculiar flooding at Reading; sometimes there is a heavy Thames flood, sometimes a heavy Kennet flood. The flood of last year was very heavy in the valley below the Kennet, and in the Kennet it was an exceptionally heavy flood. I cannot find any of the inhabitants who have ever heard of such a flood at all; as far as I can make out, from the inquiries I have made, it is 40 years since they have had such a one.

*Sir Charles Russell.*

1598. Is not the flooding which takes place at your pumping station caused by the backing up of the Thames water rather than that of the Kennet?—Yes, but the injury done to us in the way the mayor and the deputy town clerk were speaking of, does not arise at the pumping station. It arises on the fair ground at Great Knolly's-street. The water gets into the sink-traps about the houses; it comes in at such a rate that it actually overcomes our pumps, and we have had to cease pumping on this account. The water

*Sir Charles Russell*—continued.

was pouring into the sewers through the sink-traps and ventilators, so that we had to cease pumping until the floods subsided below the level of the street.

1599. For what reason have they taken the fresh land to be put under irrigation at this low level; have they not a great deal still higher up?—No, these 80 acres we have laid out are very nearly all the high land we have. There are about 30 more, but not so suitable as the other, and we want a great deal of it now, because the private drains of very nearly half the town are connected with the main sewer, and before next spring we shall probably have two-thirds of them connected, so that we must proceed with the works, and these are the highest of the low lying lands that we are laying out now.

1600. Is the intake of the waterworks at Reading above the effluent water?—Yes.

*Sir Trevor Lawrence.*

1601. Does your effluent water pass the test?—We have never had it tested yet, except by our own medical officer, but I believe his analyses are very satisfactory.

1602. Have you, as an engineer, any opinion on the subject of the Thames itself, as to any measures which it would be desirable to take to deal with the floods?—I can only speak of the district with which I am acquainted, which is about Reading, and I think we can effectually overcome them without any serious expense.

1603. By embankment?—No; down at Sonning Lock, for instance, the bulk of the water has to pass over weirs. At every lock there ought to be sufficient sluice-ways, so that no head is lost. There was a drop of 1 foot 10 inches during the last flood, and the head-water above the lock was quite three feet above its summer level. That could be obviated, but it would cost a great deal of money. In the River Kennet just above its junction with the Thames there are two railway bridges, which when first built gave free passage to the water through; two archways in each case, one of these at each bridge is now silted up. The channels of the Kennet and the Thames between Reading and Sonning have also become very much contracted by deposits and the growth of flag-beds.

1604. Then it comes to this, that dredging, attending to the bed of the river, and providing more water-way at weirs and locks, is what is requisite?—Yes, I think that would cure all the damage which the river has occasioned, so far as the valley in which Reading is situated is concerned.

*Admiral Egerton.*

1605. Has the Thames done any mischief to house property at Reading?—In the new districts built at Great Knolly's-street, and the fair ground.

1606. Those houses have been built on land subject to floods?—Only to these exceptional floods, not ordinary floods.

**Mr. HENRY DAY**, re-called; and further Examined.

*Chairman.*

1607. I BELIEVE you wish to add something to your evidence?—I wish to add one word. The low lands forming part of the Sewage Farm to which

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*Chairman*—continued.

you referred were lands specially authorised by Parliament, after strict inquiry, to be taken for the purposes of irrigation.

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*Mr. Donaldson.*  
15 June  
1877.

*Mr. Day.*

The Reverend C. WOTLEY DOD, called in; and Examined.

*Chairman.*

*Chairman—continued.*

Rev.  
C. W. Dod.  
15 June  
1877.

1608. You are Chairman of the Eton Urban Sanitary Authority?—Yes.

1609. Are you one of the Masters of Eton?—Yes, I am an Assistant Master, and have been so for 27 years.

1610. And therefore you have had considerable opportunity of observing the river?—I have been a great deal on the river, both as a boating man and a fisherman, and have paid great attention to it at all times of the year.

1611. How long have you been Chairman of the Urban Authority?—About six years I think; I am not sure I have been on the Board ever since its formation, about 12 years.

1612. Have you noticed the floods, and have they occurred periodically?—Yes, from 1852 to 1875 we had a long period of very few floods, there were no very high floods between those times. It is a difficult thing to define what a flood is.

1613. Has the towing path been covered with water?—The towing path in some places is two feet above the navigation level, and in others four or five feet. I should say that a flood begins at about five feet above the ordinary navigation level perhaps. That is how I should define the flood, taken at Windsor Bridge.

1614. In 1852 there was a very severe flood?—1852 was the highest flood that anyone living can recollect, both for length and for height.

1615. But how about this last winter?—At Windsor Bridge I think it was some six or nine inches less than in 1852. The flood in 1875 and in the winter of 1876 was about the same. The highest point was reached in the present year in January, it was higher in January 1877 than in November 1876. I think the 10th of January was the highest point, but I am not certain as to the date.

1616. Have you turned your attention to any means of obviating these floods. I presume you consider that they are injurious in a measure?—Yes, they are an inconvenience.

1617. In a sanitary, or pecuniary point of view?—We have never noticed in a sanitary point of view any harm from them. We have taken some trouble to collect statistics. Of course in a wet season we find colds and rheumatism more prevalent, but we cannot attribute it directly to the floods.

1618. You have scarlet fever, I suppose, at times, at Eton?—Very little indeed for the last 20 years.

1619. You do not trace that as arising from the state of the river?—When I was a boy at Eton, it was referred to the floods, and, I think with reason. Some 35 years ago the drainage was in a very bad state, and it used to be backed up into the cellars of the houses; but since our present system of drainage has been adopted, we have scarcely had any scarlet fever.

1620. What steps have you taken at Eton with regard to the drainage?—When the Thames Conservancy Act was passed in 1866 we applied to the Home Secretary to give us advice in connection or conjunction with three other towns, Oxford, Abingdon, and Windsor. They sent down an engineer, Colonel Ewart, who inspected the neighbourhood, and he recommended us to adopt what is called the separate system. We at

once adopted it, and carried out at an expense of about 20,000 *l.*, on a rental, I think, estimated at about 27,000 *l.*; that is the rateable value of Eton. A shilling rate produces 700 *l.*, but I am not quite sure what the value is. We have also an irrigation farm.

1621. This is met by a shilling rate, you say?—No, I was only mentioning what a shilling rate produced.

1622. What is the rate now chargeable upon the property for the purposes of sewage?—There is not a separate rate, our general district rates amount to 4 *s.* in the pound.

1623. And what used they amount to before the drainage was carried out?—We had a drainage rate of one shilling in the pound. We estimate now that the additional sewage rate is about 1 *s.* 6 *d.* in the pound, which makes about 2 *s.* 6 *d.* in the pound altogether.

1624. And you dispose of your sewage at an irrigation farm?—Yes.

1625. Is your irrigation farm flooded in times of flood?—No, it never has been within two feet of the surface of it.

1626. How do you get the sewage on to this irrigation farm?—It is pumped in an iron pipe a mile and three-quarters, having been first collected in a tank.

1627. And then raised by pumping?—Yes, by steam pumping.

1628. Supposing that works could be carried out economically, which would sufficiently prevent the floods at Eton, would the ratepayers at Eton be willing to be rated for such an object?—As far as I have ascertained their willingness, I think they would object to the rate; they would question the efficiency; they would say the question was rather begged; “we should like to ascertain the efficiency of it before we agree to the rating.”

1629. But I am assuming that the most efficient plan was adopted, then would the town of Eton be willing to be rated for such an object?—I have brought forward the question two or three times at our meetings, and they are rather shy of entertaining the subject of rating for that purpose.

1630. On account of thinking that it would not be carried out efficiently?—They think the advantage would not be in proportion to the expense. As far as I have ascertained the opinion of the principal ratepayers, the college for instance, they hold the same views.

1631. Then there would be an unwillingness to be rated?—I think so. I think they do not suffer sufficiently. The fact is, the floods are not a very serious nuisance to Eton.

1632. What are the total rates at which they are rated now?—About 6 *s.* in the pound, besides water. The water rate is 1 *s.* in the pound, but that is a private rate; it is a private company.

1633. The urban authority has nothing to do with that?—No; it is the same company that supplies Windsor with water.

1634. And where does that company derive its water?—It is simply Thames water filtered. Wells are dug down into the chalk, but it is simply the water filtered through from the Thames, although it has no connection with the Thames.

1635. But it is derived from the Thames, and

*Chairman—continued.*

is filtered?—It is tubbed out to a certain depth and the water rises, but it really is the Thames water, I believe. The upper chalk is not water bearing in that part. The attempts to get water out of the chalk have entirely failed. They sank 400 feet at one of the breweries, and they could not get a permanent supply; although in the chalk it is surface-water filtered.

1636. Do you think that measures could be taken for remedying the floods at Eton?—I think they might, at a very enormous expense. I think that Windsor and Eton might be freed from floods, but, at the same time, we should be met with strong opposition from those below us, as we should bring the water down upon them. We should increase the floods at Datchet and Egham. There is a natural watercourse at the back of Eton that the water takes at flood time.

1637. Suppose there was one general scheme adopted along the river for carrying out such works economically, would the people of Eton then object to pay their proportion?—My own opinion is that it would be worth a small rate, but if we consented to be rated, I do not know what we should be agreeing to.

1638. You think that a very small rate would be borne?—If you could get off two feet of flood for 1 s. in the pound it would be worth while; two feet out of eight, if the highest flood is represented by a rise of about eight feet.

1639. Has the action of the Thames Conservancy, as affecting Eton, been brought under your notice at all?—No.

1640. You say that the floods have risen as high as eight feet at Windsor?—I think that the flood of 1852 represented a rise of between 8 and 9 feet; it was 8 feet 6 inches at Windsor Bridge. Of course it makes a difference if you take the rise of the water above or below the weir; what is 8 feet above the weir is 10 feet or more below the weir, because the weirs practically disappear in flood time.

1641. The flood of 1852 then was 8 feet 6 inches on the upper side of the bridge at Windsor?—Above the navigation level; the level has been permanently raised. They made a new weir about four years ago at Windsor, and the water has been permanently raised rather more than a foot by that.

*Sir Charles Russell.*

1642. Is that by raising the sill?—The sill of the weir is higher.

*Sir Trevor Lawrence.*

1643. Do you think that affects the flood as well as the summer level?—No; I think the summer level has very little to do with the floods. The difference of the rate of flow is so very great in winter and summer, that the water backed up, in my opinion, makes very little difference in the flood.

*Chairman.*

1644. When was this sill raised?—About four or five years ago. I am not quite sure of the date.

1645. Then, we will say, about 1872?—About that.

1646. And to what extent?—More than a foot, I think.

1647. And how has that affected the floods, either way?—The beginning of a flood it affects a good deal, but I think all difference of that 0.114.

*Chairman—continued.*

sort is lost. As the water rises, the channel of the river becomes so much wider, and the rate at which the stream flows is so much greater, that my private opinion is that the backing up, so to speak, by the weirs makes very little difference in a large flood.

*Sir Charles Russell.*

1648. Do you think that the river, say from Eton to Maidenhead, is better kept now than it was 30 years ago, as regards silling up, weeds, and matters of that kind?—There has been a very great deal of dredging since that date; the bed of the river is deeper generally, and there is less chance of running aground anywhere.

1649. I noticed the other day, not having been there for a long time, that a sort of island has formed itself at Lower Hope?—Yes, that has been gradually increasing, and on the opposite side, Clewer side, it wastes away. I think there is as much as 20 feet washed away in the last 30 years, of a field there.

1650. And does it silt up on the other side?—Yes; the corner makes that back stream, and the sand is brought round the corner of Lower Hope.

*Admiral Egerton.*

1651. What is the present state of Romney Lock?—Romney Lock is the lock near New Windsor; it is a lock between Eton and Windsor.

1652. Is it an obstruction in any way?—I do not think a lock has a right to be considered an obstruction at all, because the lock-cut is generally cut clean, so that it gives an additional flow for the water.

1653. Has there been anything done at Old Windsor itself to facilitate the escape of floods?—Yes; both at Romney Lock and Old Windsor Lock there has been a watercourse made which certainly assists the flowing away of the water very much indeed.

1654. On the whole, I understand you to say, that the floods are not worse than they have been within your knowledge?—I think, under the same circumstances of rainfall, they would be the same as they were 30 years ago, as far as one can judge, but it is so very difficult to know that you have the same circumstances to judge by. There is one point upon which I do not know whether you have had any evidence, namely, as to the relative quantity of water coming down the Thames in winter and in summer; that is a point, I know, the engineers of Cooper's Hill have been making a special investigation into during the last two years, and I have the result of their investigation second-hand.

1655. At what point of the river was this?—Albert Bridge, between Datchet and New Windsor, where the whole river goes under one arch, both in flood time and in ordinary times; it is about three miles below Windsor. The relative quantity of water they made out to be, between the smallest and the largest, was as 1 to 35; I think it was in January of this year they gauged the largest quantity.

1656. The maximum and the minimum?—Yes.

1657. What was the maximum?—I cannot remember the figures, but the ratio was 35 times the quantity of the minimum. I simply mention that, to show that any channel to relieve the floods

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floods effectually must take about 20 times the summer flow of water. I think the rate of the stream is some 15 or 16 times as fast, and the depth more than twice.

Sir Trevor Lawrence.

1658. Has there been any alteration at Romney Lock, by the substitution of one efficient new lock for some old locks, in your recollection?—They have made two water-courses from the lock-stream to the main channel of the river, which has eased the floods very much, because now a large quantity of water in the flood time comes down the lock-stream, which gives it an additional water-course to what it would have naturally.

1659. Were any old locks removed there?—Yes.

1660. One, or more?—One set of locks, but the channel was changed, and also the place of the locks.

1661. So that there were two locks; one was removed, and the channel of the new lock altered?—Slightly altered.

1662. And the effect was materially to lessen the floods, and improve the channel of the river?—There are two water-courses now from the lock-stream, the barge-stream, which carry a great deal of water round the weir, without going over the weir.

Mr. Watney.

1663. I think I understood you to say that you thought the floods could be cured by Eton, by altering the channel of the river?—I think that you might make a flood course, but it would be such an enormous undertaking that I think it is almost out of the question.

1664. Is not the soil there porous, so that the water rises up through it, and even if you get a river bank up, would you then prevent the water rising through the soil?—The effect would be permanently to lower the channel of the river, which would allow the water in the soil to get off into the river; the object is to lower the level of the river, and if you could lower the level of the river, you would drain the soil, and the water would not be backed up in it.

1665. Then that would have to be done the whole length of the river?—Yes.

1666. It would involve a very large outlay indeed?—It would be a very large outlay. The reason why it would be necessary to do it for the whole length of the river is, that we should bring the water out upon Datchet, Old Windsor, and Egham very much quicker, and we should flood them.

1667. Do you think that anything could be done to lessen the floods, by having the water of the locks let down lower than is usually the case?—I think it would be hardly appreciable in a long flood. The additional water that is dammed up for navigation purposes, represents a very small proportion; it does not represent more than 8 or 10 hours flow past Teddington Weir in flood time.

1668. What I meant was this, when there were heavy rains in Gloucestershire, if the lock-keepers had orders to lower the water in the locks one or two feet, would not that have a considerable effect?—I think if they were to draw the weirs to the lowest in the beginning of winter,

Mr. Watney—continued.

the difference would be hardly appreciable in a long and high flood.

1669. I do not mean in the beginning of winter, but after heavy rain; suppose there was heavy rain in the beginning of the week, and they had notice from some central office to lower their locks one or two feet, would not that have a considerable effect in keeping the floods down?—That is rather an engineer's question, but, as far as I can understand the subject, I think it would have very little effect.

Mr. Richardson-Gardner.

1670. Upon the question of embankments, do you think that local embankments are desirable on the banks of the river, to save towns from the overflow?—I think, in a place like Eton, they would be of no use whatever. If you were to make an embankment perfectly waterproof, and carry it down 8 or 10 feet perfectly waterproof, so as to exclude the side water entirely, we should suffer worse than ever, because the water would soon accumulate inside the embankment so as to make a pond, which would be higher than the level of the river.

1671. There is a scheme for making an embankment at Windsor; even if they were to do so, and it was carried out properly and effectually, the probability is that it would cause your floods in Eton to be still greater than they are?—It might alter the channel of the river in some way, but I do not think it would raise the height of the river.

1672. There has been a plan suggested, of cutting canals, and getting rid of the bends of the river in several places; at a public meeting in Windsor, I being present, a plan was proposed for cutting a canal from Athens below Eton Bridge?—From Athens, below the playing fields; I know the plan.

1673. Do you not think that that would be effectual in relieving Windsor and Eton?—I think it would, if it were on a sufficiently large scale. The first thing which would happen would be, that we should have actions brought against us for flooding the land immediately below us, I have no doubt.

1674. You think that would be the result?—I think it would; I think that if this cutting was made capable of carrying 20 times the summer flow of the Thames, it would relieve Eton and Windsor immensely, but the cost must be reckoned by hundreds of thousands of pounds. The whole of it must be lined with something which resists water, or you would wash away the whole of the land.

1675-6. Therefore of course, if it did not apply well in that locality, it would not in any other locality?—I do not undertake to say that a great deal might not be done in that way; at the same time, people talk of it as a thing which is easy and which might be done at a small expense.

1677. I know it would be expensive, but it would be effectual?—Yes, I think it would be.

1678. You do not think that Eton College would be likely to join in such a plan as that?—I cannot answer for Eton College. I think it would be rather an objection to their playing fields.

1679. I thought, perhaps, that considering the health of a large college like Eton, which is of such great

*Mr. Richardson-Gardner*—continued.

great importance, that that would be a thing that they would be willing to join in?—We have no reason to think that the health of Eton is unfavourably affected by the floods in any way whatever.

*Chairman.*

1680. You have not many instances among the boys, of low fever?—Oh, no, it is almost unknown.

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*Mr. JOHN THOMAS MILLS*, called in; and Examined.

*Chairman.*

1681. You are a farmer in the neighbourhood of Cookham?—Yes.

1682. What extent of land do you occupy?—Between 400 and 500 acres, that is in the Thames Valley. I occupy more on the hills, but that is right in the Thames Valley.

1683. Is your land principally arable or pasture?—There are about 300 acres of arable land, and about 140 acres of meadow land.

1684. Is your farm frequently flooded?—Yes.

1685. And do you find that your land is injured or benefited by the floods?—I think, in ordinary floods, where it only comes over the meadows, and does not remain long on them, they are benefited, but when we get floods like we have had during the last two years and in 1852, the damage is very serious, because it extends over a large portion of the arable land.

*Sir Trevor Lawrence.*

1686. How much arable land that is within the influence of the floods have you?—Perhaps 100 acres, and perhaps more; I have not gone into it exactly. It has been more the last two years, decidedly.

1687. But that is exceptional?—Yes, because in the fields which are not entirely covered with water it rises through the soil to the extent of two or three acres in a place; it has to recede through the subsoil, which is a slow process.

*Chairman.*

1688. Then the damage in high floods is very serious?—Very serious; I may mention that I had bullocks tied up in the homestead, and they were knee-deep in water in the last flood, and I was obliged to remove them.

1689. Have you applied for any reduction of rent in consequence of the floods?—No, I have not.

1690. Supposing you were free from floods, should you be willing to pay a higher rent?—No, I would not pay a higher rent, but I told my landlord during the winter that I would not pay so much rent if we were to have floods like we have had during the last two years; I would not give so much by 200 l. a year, and that represents something like 10 s. an acre.

1691. Do you hold a lease, or are you an annual tenant?—I have a lease.

1692. And do you expect on the expiration of your lease to get a reduction of rent?—Other landlords have made a reduction, and I shall mention it to my landlord that such has been the case.

*Sir Trevor Lawrence.*

1693. Has that reduction been owing to the floods, or other circumstances?—Entirely owing to the floods.

*Chairman.*

1694. Do you attribute the floods in your neighbourhood to any particular cause?—I may  
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*Chairman*—continued.

mention that being a sufferer I have given a great deal of thought and attention to it, and I believe that floods may be very much abated by the weirs being drawn earlier than they are upon the approach of floods; for instance, when there is a rainfall, if there could be some system of telegraphs, or something by which the lock-keepers should have orders to draw the weirs at once, instead of leaving them entirely to these men, it would be a great improvement; they have certain gauges, but until the water rises above a certain gauge, the high-water mark, they are not obliged to draw the weirs, and I believe they have instructions not to draw the weirs, no matter what rain they find there has been, and no matter whether there has been an inch of rain in the night, until the water comes down upon them, they do not draw the weirs, consequently it flows all over, it fills all the subsoil for miles round, and then the river cannot carry it off.

1695. Are you near Temple Lock?—No; my Valley Farm is not near Temple Lock, my higher farm is.

1696. What lock are you near?—The Cookham Upper Weir; there are two weirs at Cookham; the upper one is Cookham, and there is one rather lower called Odney Weir.

1697. Below Marlow?—Yes, below Marlow.

1698. You believe that if those locks were opened in very rainy weather before the floods began, that your farm would not suffer so much injury?—It would not suffer so much injury.

1699. You feel quite confident about it?—I feel quite confident, and I may mention this: I do not know whether it was the fault of the lock-keeper, or whose fault it was, but the Upper Cookham Weir this year had 22 of the upright pieces called rimers, and 11 gates shut during the whole flood.

*Sir Trevor Lawrence.*

1700. How many gates do you think there are in the weir?—I do not know.

1701. Would 11 gates be a third, or half, or what?—I cannot tell you what proportion, but certainly they were an obstruction. When I mentioned it to some of the Conservancy people, they said they were directly behind the piles which formed the framework of the weir, and therefore were not an obstruction; the piles of the weir would be probably nine inches or a foot in width, but these gates were certainly much wider than that, therefore of course they must have caused some obstruction.

*Chairman.*

1702. You never thought of writing to the Thames Conservancy Board to get them to give orders to have these locks opened?—Oh, no. I have mentioned it to private individuals, Mr. Vansittart, for instance, and others in our neighbourhood.

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1703. Is



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Chairman—continued.

1703. Is Mr. Vansittart your landlord?—He is my landlord of another farm I hold, but not at Cookham.

1704. Did Mr. Vansittart undertake to write to the Thames Conservancy Board?—He is a Conservator himself.

1705. Then you were going to headquarters?—I spoke to him merely as a landlord and as a neighbour.

1706. What was Mr. Vansittart's reply when you spoke to him as regards these locks not being opened, and that your land was damaged in consequence?—I do not know that I told him of this one special instance of the lock not being opened.

1707. You tell the Committee that your land is damaged, and that you suffer injury, and that you attribute it in a measure to Cookham Weir not being opened in rainy weather before the floods came down?—I do not mean Cookham Weir entirely.

1708. Any weir?—Yes, on the whole course of the River Thames.

1709. The Committee understand that from you, and that the step you have taken has been to speak to one of the Conservators who happens to be one of your landlords?—Yes.

1710. What did Mr. Vansittart remark upon that?—I cannot tell you exactly.

1711. That he would see to it, or that it was not the case, or what?—He did not say it was not the case, because I think he acquiesced that if the weirs were drawn earlier in the autumn, and the water could be reduced in the river earlier, then we were not likely to have such serious damage arising from floods as at present.

1712. But you say that you feel that you ought to get a reduction of 200 *l.* a year upon this farm as long as it is flooded to the extent it is?—Yes, the last two years.

1713. Did Mr. Vansittart undertake to do or say anything?—I do not know that I mentioned to him about the reduction of rent. I mentioned it to my landlord when the floods were at their height; we were in a great state about them; we could not get about the land; the horses were in the stable and we could not do any work; we were smarting under that.

1714. It was a serious inconvenience, no doubt. Then the result of your application to Mr. Vansittart was nothing?—I did not lay it in the shape of an application, I simply spoke to him as I would speak to any other gentleman in the course of conversation respecting the floods; it was not because he was a conservator that I spoke to him. I think if there could be some system of telegraph from head-quarters to the different lock-keepers, instead of leaving it entirely at the option of these men when to draw the weirs, it would be attended with beneficial results. I may mention that I know instances in my neighbourhood where reductions have been made by landlords.

1715. On account of the floods?—Yes, one farm I can mention where the landlord has promised to return his tenant 50 *l.* for three years, that is 150 *l.*, and another where the landlord has promised to return 100 *l.* in four quarterly payments, showing that, although he is a poor man he still feels that his tenant has suffered severely.

1716. At present you have not had any reduction made in your rent, nor have any steps been taken to diminish the injury you state you have

Chairman—continued.

suffered from floods?—No steps have been taken.

Sir Charles Russell.

1717. You, I suppose, know pretty well when you are likely to have a flood; that is to say, if you have lived much by the side of a river, you say, "I think we shall have a flood"?—Yes.

1718. And have you ever noticed, when such has been the opinion of yourself and your neighbours, that any steps are taken at all, at the weirs or elsewhere, to endeavour to reduce the volume of water in the river?—Not until it actually comes upon them.

1719. They wait?—They wait until it actually comes upon them.

1720. They do not send for the engine until the house is half burned down?—Yes, that is my argument; that they do not draw the weirs soon enough.

Mr. Watney.

1721. How fast does the water generally rise in the river; how long does it take to rise a foot?—If it rises a foot in the 24 hours, we should say it rose very fast.

1722. How much could they lower it by opening the weirs as you suggest?—The Thames Valley is of a very porous nature; while the river is low, the subsoil is comparatively dry, and when the water first flows into the river, it takes a long while to rise much, for the very reason that the subsoil is a great absorbent, becomes a vast underground lake; when that is nearly full, and the river is bank high, or nearly so, the water then rises very rapidly and flows over very quickly, for instance, a small amount of rain will cause a flood after another flood, or when the subsoil is filled with water, sooner than it will when the water has been for a long while low in the river. So that if the river should be kept at a low level, the lower the level the greater the amount of water it would carry off, and therefore the greater prevention there would be of the floods, whether the sills of the weirs could be lowered, and certain bars that we know of, or banks across the Thames could be removed, I do not know; but there is one, Mr. Vansittart told me, they had not a powerful enough dredging machine to remove it; it is a rock which forms a sort of bar, so that at low water the boats cannot pass over it.

1723. What you suggest is, that there should be some central authority, who should telegraph to these lockkeepers, and that they should have orders to lower the weirs when the floods were likely to come?—Yes, that rainfalls should be recorded by gauges at different points on the Thames, and that they should telegraph to some central authority, and, according to their judgment, that central authority should telegraph to these lockkeepers or weirkeepers to draw the paddles.

1724. I think I understood you that it would take 24 hours for the river to rise a foot?—I have no data to go by, but I know that we consider, if it rises a foot in 24 hours, it rises very fast.

1725. And how long would it take to lower it a foot?—In the summer of 1875, when we had a great deal of rain, which was quite unprecedented, I think, for the time of year, Captain Etheredge came down in his boat, and he ordered the lock-keepers at once to draw the weirs, and



Mr. Watney—continued.

and that lowered the water something like a foot or 18 inches in a few hours.

1726. Six or eight hours?—Or even less than that; the water runs away very quickly.

1727. So that, according to your opinion, it would be possible, by opening the weirs, to keep

Mr. Watney—continued.

the rivers low, even in case of floods, if they began soon enough?—As regards an exceptional flood such as that of last year, I do not know, but in ordinary floods, I believe the water could be kept down very much, and, in such floods as last year, very much reduced.

Mr. Mills.

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Mr. WALTER WILKINSON, called in; and Examined.

Chairman.

1728. You are Town Clerk of Kingston?—I am.

1729. For how many years have you been so?—Fifteen years.

1730. Your attention has been called to the floods in the neighbourhood?—Yes.

1731. Do the floods inflict injury upon property in the neighbourhood of Kingston?—They did this last year considerable injury.

1732. Were any of the houses flooded?—Yes, a great number in the low-lying parts of the town. The worst parts of the town, in point of fact, small properties were very much flooded, and the streets were also flooded.

Sir Trevor Lawrence.

1733. Is that often done?—In the low-lying parts of the town.

Chairman.

1734. To what do you attribute the high floods?—I should say it was simply the excessive rainfall in point of fact.

1735. And do you think that any steps can be taken to alleviate the injury?—As far as Kingston is concerned, I am apprehensive that the suggestions which have been made will make matters decidedly worse. The suggestions that are made for relieving the upper Thames, it seems to me, will bring the water down upon us much more rapidly, and then Kingston, of course, is affected by the tidal influence, and the consequence is that we shall not be able to get the water away.

1736. Then you would prefer to let matters alone?—Well, I will not say that quite; what I feel is this, that if our neighbours above conduct the water down to us, in seasons of floods, much more rapidly than at present, with the tidal influence backing us up, we shall really be smothered. No doubt, in this last flood, if these locks had been opened, we should have been in a much worse condition than we were. If you could sufficiently, in anticipation of a flood, adopt a system of that kind, it might be an advantage, but I imagine it would have to be some time beforehand, because we get the up-country water at Kingston some two or three days after it has fallen.

1737. When at Kingston, you can generally calculate, in a measure, when there will be a flood, from your knowledge of the waters in the upper part of the Thames?—Yes, if we get the rainfall on Monday in our district we should know perfectly well that we should have the river at the same height as it was then, probably, until Wednesday or Thursday. I mean to say, if it ceased raining on Monday the river would still continue the same height for two or three days afterwards because we get the up-country water down.

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Chairman—continued.

1738. Do you think, that by means of telegraphic communication, opening the weirs in anticipation of the floods, they might be abated or diminished?—I should think they might be, to some degree. The locks might be better regulated, and if it was done, as I say, sufficiently early; the only suggestion I should offer to that is, that in the late summer, before the rainy season the river should be kept as low as possible.

1739. Have you anything to say with regard to the action of the Thames Conservancy, as far as Kingston is concerned?—No, I have no complaint to make against them at all.

1740. Supposing works could be carried out to relieve you of these floods which have done you so much injury, would Kingston be willing to bear its fair share of the expense?—I do not think that anything is wanted in that way; I think that these floods are so exceptional; we have not had a flood before this one, of the same character, since 1852.

1741. Then you would be willing to take the chance?—Yes, certainly, rather, than any such gigantic scheme as I have heard of. Anything like canals, or anything of that sort, I should decidedly object to paying a proportion of.

1742. Is there any other point which you wish to inform the Committee upon?—If there was any scheme of that sort, I think that the riparian interests ought to be represented on the Board; if there was any taxation, of course taxation and representation go together as a general rule.

Sir Charles Russell.

1743. You seem to find from experience that you have some two or three days' notice when you may expect a flood; do you think it is worth while to take advantage of these two or three days by letting down all the water that is possible; at Kingston and at Teddington and all those places, so as to make the channel of the Thames as clear a vehicle as you can conveniently make it?—Yes, I think so certainly, if you can anticipate it sufficiently; if you can anticipate the flood sufficiently I think you should do so.

1744. But I presume you admit that, even allowing for the tidal influence, a vast volume of water could be discharged in three days before the flood came?—Oh, yes.

1745. That you could lower the level of the river very materially in three days before the flood-waters came upon you?—Yes, all I say is, that we should object when the rain began, to the locks being then opened.

1746. Above you?—Above us.

1747. But I suppose you do not object to their being begun downwards, that is to say, begin at Teddington and pulled up all the way up, so as to allow the river to fall by stages?—Quite so; and then you must also bear in mind that the same amount of water is falling

Mr.  
Wilkinson.

Mr.  
Wilkinson.  
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Sir Charles Russell—continued.

falling probably below Teddington Lock, and that influences the tide, and backs it up. In the last flood the tide and the water were flowing level over Teddington Lock.

1748. Yes, but that was only in the height of the flood; it was not at the beginning?—No, it was at the height of the flood, no doubt, but still you could not get any more water away then.

1749. Except during the ebb of the tide?—Yes, during the ebb of the tide a little might have gone away no doubt.

Sir Trevor Lawrence.

1750. Your position at Kingston is somewhat exceptional on account of your being so near the tide-way?—That is it.

1751. And there are several hours during the day during which time no water hardly will run off, owing to the tide?—That is it.

1752. What happened at Teddington Weir during the late flood?—Teddington Lock burst at the side, a breach was made in the wall, and it relieved us a great deal; the water then flowing down the Thames flowed over the adjoining land; it submerged a vast district of land, that is the way it got relieved, it did not get any relief down the Thames itself, it only got relief over Mr. Hatch's meadows.

1753. What was the effect at Kingston?—The effect was to relieve us a good deal; it let us down several inches when the lock burst.

1754. It let you down two feet, did it not?—Yes, I should think 18 inches, probably.

1755. So that almost the whole of the town, which had been previously submerged became free from water?—Yes, a good deal, but we got a good deal back by the next tide.

1756. Would a moderate expenditure in embanking works at Kingston free you from any danger of flood altogether?—I do not think it would, because I think the water comes from the hills; from Kingston Hill and Surbiton Hill, through the subsoil, and a good deal of flood is caused by that water not being able to get into the Thames; it is kept back. I think it is an error to suppose that the river flows through the soil, but the river stops the land water getting away.

1757. What have you done about the drainage at Kingston?—There is now a Provisional Order, made by the Local Government Board for the united district of the Lower Thames Valley, and the Bill is now in the House of Lords for the confirmation of the Order.

1758. At present it goes into the Thames?—At present it goes into the Thames; we have had several schemes, and have made several

Admiral Egerton—continued.

efforts, but we have not been able to deal with the subject; but the Local Government Board have taken it up, and the Bill is to be read a second time in the House of Lords on Monday.

1759. Have you any estimates for the works which will have to be undertaken under that Bill?—No, none at all; because it will be taken out of our hands, and put into the hands of a joint Board.

Admiral Egerton.

1760. Some of your works have been executed, have they not, which are applicable to this scheme?—No.

1761. Not the old drainage works?—Of course the sewerage of the town has been carried out many years, but in any system they would have to have been carried out, and so far we are in advance.

Mr. Watney.

1762. I understood you to say that if the suggestion which has been made about the weirs being opened quicker up the river were carried out, Kingston would be in a worse position, because you would have the water down quicker upon you?—Yes.

1763. How long does it take that water to get to you; does it all go at one tide?—Oh, dear no. As I described it, in an ordinary heavy rain we should feel the effects of it; in a 24 hours' rain we should feel the effect of it probably for three or four days.

1764. Below the lock, or above the lock, do you mean?—The lock is some distance below us; about two miles below us.

1765. If it were let down at the lock, would they feel it below the lock?—Oh, yes, it would really actually be passing it on. I think you will probably have evidence before you that Twickenham and Teddington, and all those places which were below the lock, were badly flooded, and of course if this had been passed on all the quicker, it would be only passing the ball on to them, as it were.

1766. Then your idea is that the water could not be passed off from the river quicker than it is at present?—No, I do not say that. I think that possibly, as I have said already, if you could keep the river low, in anticipation of the floods, good might be done, and I think that probably by the locks being regulated by telegraph, or something of that sort, relief might be had.

1767. But you think no good could be done after a flood has once occurred?—No, I think not; at any rate, I think great evil might be done to us, and self-preservation is the first law of nature.

Mr. CHRISTOPHER TOWER, called in; and Examined.

Mr. Tower.

Chairman.

1768. You are a considerable landowner in the Valley of the Colne?—Yes. To save the time of the Committee I will hand in a paper which represents very nearly what I have to say upon the subject. I have also an authorised map that was put together some years ago by an experienced engineer for the millowners generally, representing all the mills over the whole course of the river, from its rise in the Chiltern Hills down to

Chairman—continued.

it joining the River Thames between Staines and Twickenham. I have it in the room if the Committee wish to see it.

1769. Is your land adjoining the River Colne damaged by the flooding of the river?—It was so, that is to say, a portion of it. My property runs from a certain road between Windsor and Uxbridge on the north down to Colnbrook, and the old Bath road on the south, a distance of four miles

Chairman—continued.

miles, straight as the crow flies. The first three miles, when I went to reside there in 1841, were very much flooded, and in fact you could go from the point I first mentioned in a boat in the fields and roads, and there are people alive now who remember going so down towards West Drayton; and, in fact, I may say, almost to Colnbrook; but, from the steps I have taken, having the command of three streams which form the river below the parishes of Denham and Harefield, I have generally succeeded in stopping all floods between the road which I first mentioned and the Great Western Railway at Drayton.

Sir Charles Russell.

1770. Have you got the map that you were referring to with you?—I have, and I think you will see it better by that. (*The Witness produced a map.*) This map represents the water-shed of the River Colne from its source as high up as Dunstable; there are six heads of the river, and they join altogether *here*, near Rickmansworth, and *here* is Harefield; *this* is Mr. Newdegate, M.P.'s place, and *that* is Mr. Lambert, M.P.'s place; it forms itself into three mill-streams between Rickmansworth and Mr. Lambert's park; there are two weirs, built about 1872 by the son of the engineer who made this map, who is well known among all the millers and the mill-owners; they met together and erected these weirs to regulate the three mill-streams from that point down to Colnbrook which constitute the Colne River below; the floods generally, I may say, altogether, or nearly so, have from time out of mind been in the valley, which is narrow here; all the streams diverge above, and there has been the principal flooding below Rickmansworth down to Colnbrook, as far as *here*. It is three miles from Longbridge at Uxbridge, to the Great Western Railway. This last winter, and for winters past for some years, there have been next to no flood-waters in that distance, owing to the different steps that I have taken, being able to control the water of the three streams in that distance, or the greater part of it. Below the Great Western Railway there are floods still over my property, and over other people's property, from there to Colnbrook, and I attribute them in a great measure to the impossibility of taking steps individually to improve the rivers. If it was done under proper surveillance by a Body appointed for the purpose of cleansing the rivers, and removing the obstructions, and, in fact, regulating the whole rivers, and seeing that the mill-heads are kept right, and that the waste water-gates are of proper dimensions, and at the proper level, and that each mill has a proper self-acting overflow, I think the floods could be prevented. I have put in as few words as I can upon that paper which I handed in, what I think wants some legislation, or some Body to regulate, for all the owners of property, both millowners and landowners. Several of the millers have scarcely any landed property adjoining, therefore, of course, they do not chime in always with the landowners. I am owner of three mill-heads in the district that I have mentioned, and I can conceive that there is a means, with proper regulations, by which the whole valley might be entirely freed of floods, at all events down to Colnbrook. When you get beyond Colnbrook and get down towards Staines I have not sufficient

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Sir Charles Russell—continued.

knowledge of the floods to be able to answer whether or not that flat-lying country that is nearer the River Thames can be kept from floods entirely, but I feel perfectly satisfied that there need be no floods, at all events, down to Colnbrook, from the steps I have taken, and what I have myself done, where I have the command of the stream.

1771. Then from your experience in controlling floods in the valley of the Colne, you have arrived at the opinion that in the valley of the Thames, *mutatis mutandis*, similar means might be adopted?—I do not know so much of the Valley of the Thames except by passing through it. It depends very much upon the levels, the fall of the water, and other circumstances. Until you get into the valley of the Colne (which is a main tributary of the Thames), down to Rickmansworth, you are in the chalk of the Chiltern Hills, and you have a more rapid flow of water. There are six heads, which afterwards only form three in a confined valley, therefore there is more difficulty in the lower part of the valley than in the upper. Although I am pretty well acquainted with the country in Hertfordshire and upper Buckinghamshire, I do not think there are any floods there of any importance, but the floods begin at Rickmansworth, passing through Harefield and Denham, and from thence downwards there have been floods. I can bring evidence to show, that before I went into the neighbourhood, there were bad floods from Uxbridge to the village of Iver, near where I reside. This winter we have had no floods at all, and people have remarked what a benefit it has been to the neighbourhood, so that it shows that what has been done has been done effectively; but below the Great Western Railway I cannot say that the same absence of floods exists; every year more or less there are floods in the low-lying country. There was a railway which was projected, and has been in abeyance for ten years, which Mr. Darvill, who was here just now, knows about, which would have been under water almost every year if they had carried it out. The Great Western Railway Company is under a penal clause in their original Act, which I have here, to keep a certain water-level, or if they have it on the upper side a certain number of hours above a certain level, they are bound to pay a penalty and to rectify it. I cannot say, as far as the property I have had to do with is concerned, excepting a small portion of a property lately purchased, that it has been injured by that embankment; but I think the principal thing is the cleansing of the river (which is to my mind a very material point) and of the shallows and mud obstructions. If you have not a fairly sufficient space to carry the water down, no matter when you open your flood-gates or other conveniences for letting the water out, if there is not sufficient space to take the water through and pass the river, you must obstruct the water, and more or less cause floods. I have always found that opening the gates the moment there comes, say in the month of November, anything at all approaching to heavy rains, is a great means of prevention, and it is a great point to be in advance of the flood, but it would require to be done simultaneously all through.

1772. Are you of opinion that any authority  
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Mr. Tower.

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Sir Charles Russell—continued.

having jurisdiction over the whole of the Thames could apply some such principle as you have successfully applied in the valley of the Colne?—I am not at all able to say that it would have so complete an effect as I have been able to obtain in a length of three miles in the River Colne. There may be more fall in the River Colne, and I have carefully taken the levels and so on, to get at what can be done, and what cannot be done. Of course, the more sluggish a river is the less the fall, and the less chance you have of getting the water to run through its course; but I do believe that a very great amount of these difficulties might be met, and the floods might be controlled in a great measure by proper surveillance, by keeping the banks properly attended to, and letting off the water, and more particularly with regard to the fact that there should be a self-regulating weir at the highest level of the water-head and independent altogether of waste gates; that the waste gates and all those means of letting the water off should be under surveillance to see that they are put in properly and are kept in proper repair, and are of a proper area to let the surplus water out. I do not think anything can be possibly done to prevent floods without some such surveillance. I would just mention that these three streams now are a sort of charge upon the owners of the mills or of the water; at all events they are attended to by voluntary rates. They do in their own way cut the weeds in summer, which is one point, and remove obstructions, and so on; but from the fact that there is not a combined action, it is not sufficient to prevent floods where there are various parties owners of the different streams. With one system all through, a uniform system, I think you might prevent floods in this valley. As to the Thames, I can only say, from what little knowledge I have of it, I think a great deal may be done to prevent such floods as we have had of late years, because it is notorious that you could not get to Datchet from one side, from Uxbridge, and you could not get direct to Windsor, a great part of this last winter.

1773. You believe that by some central control, these floods might, at all events, be reduced?—Yes, and in our valley I am perfectly certain they could be got rid of altogether.

1774. I suppose the action of the Thames Conservancy has not come under your notice further than the five miles up the Colne?—Only as far as sanitary purposes are concerned.

1775. Does it touch your property?—Yes, it does come within the five miles, and they acted upon the Act of Parliament of 1866, which gave them extended power from three up to five miles.

Sir Charles Russell—continued.

In fact I partly suggested the matter, and they have acted upon it since.

1776. Have you any remark to make to the Committee in connection with the Thames Conservancy as regards your property?—No, except that I should be glad to see that, or any other sufficient authority, have control the whole way up our valley.

1777. Do you think it advisable that any sanitary authority, having jurisdiction over the Thames, should have jurisdiction over the tributaries of the Thames?—I myself think that the Colne with its branches and ramifications would almost require some separate jurisdiction, but that is a matter of detail. I can hardly say whether they can carry it out with the Thames in its entirety. The control of the Thames in its entirety from Cricklade down to Staines, with all the other rivers coming into it, would be certainly a very great matter of business.

1778. But you think whatever this authority was, that by duly opening the weirs, clearing out the weeds, removing obstructions, and dredging the shallows, much good might be done?—Yes, there are some individual cases that I know where there is a quantity of water which comes down of a sudden after some heavy rains or snow in parts of these tributaries of the Colne, and there is not sufficient depth of stream, from the shoals having increased, to carry off this surplus water, therefore it must necessarily flood. But if owners object to your touching the bottom of the stream (as it is called a freehold in itself), you cannot remedy the floods. There is one other point that I would mention, which is this, that part of the cause of the floods below the Great Western Railway, towards the road known as the Old Bath road, is this: the main stream of the Colne has evidently been diverted for mill purposes, and the original stream is the county division between Middlesex and Buckinghamshire; and it being of a serpentine course, it checks the flow of water to a very great degree, and therefore prevents the keeping of the water off the land. I think if there was power given to straighten the course of such streams, it would be a very great point, and decidedly obviate the difficulty. There have been different plans for this, and I have one here, but, of course, if the land owners do not agree there could be nothing done, although it might be the greatest possible benefit. I have here a list of all the mills on the map produced.

1779. There are a great number of them, I see?—A great number.

Sir PATRICK COLQUHOUN, called in; and Examined.

Chairman.

1780. You reside on the river, I think, at Shepperton?—I reside at Shepperton, in the Thames Valley, opposite the confluence of the Wey and the Thames, which makes the floods probably worse there than they are elsewhere. The obstructions in the river consist of islands, osier beds, banks, alluvial deposits, and bridges. The islands should be removed by the competent authority, under powers of Parliament where considered necessary. The Lands Clauses Consolidation Act should be incorporated into any

Chairman—continued.

consolidation of Conservancy Acts. I do not know whether I am in order.

1781. It is a little unusual, but as long as we get your evidence it does not much matter how it is given?—Very well; I will not adopt that plan.

1782. You mentioned several matters as being obstructions in the river, and causing floods, but you have omitted mills, weirs, and locks; what is your opinion upon this point?—With respect to mills they have encroached from time to time upon

*Chairman*—continued.

upon the rights of the river, particularly by raising their sills in order to get a better head; that is an abuse.

1783. Then as regards locks, do you consider that they have any effect?—I should think not.

1784. As regards the weirs?—As regards the weirs certainly, yes. The construction is antiquated; there are large fender piles and rymers, and other framework which, added together, represents a large obstructive area.

1785. What alteration would you suggest in them?—I should suggest that for them should be substituted iron gates or shutters balanced to wind up and down easily, so that water might escape from the bottom, and not from the top, and produce scour in the river, and carry away the deposits.

*Sir Trevor Lawrence.*

1786. Have you any special knowledge on those subjects?—I am a lawyer, not an engineer.

*Chairman.*

1787. But you have paid some attention to this question of Thames floods?—I have paid considerable attention to it. I have suffered from it very much, which was the cause. I have conversed with many engineers, and made up my mind upon such evidence as I have had an opportunity of getting.

1788. As regards the engineering question, we shall have engineers to give us further information. But as regards the action of the Thames Conservancy, have you any remark to make on the constitution of that body?—Of course I am perfectly aware that these improvements which we, the riparian proprietors of the agricultural districts desire, cannot be done without money. I believe, from the conversations I have had with the different persons connected with it, that they would not object to be taxed, because that taxation would be less than the damage caused by the floods.

1789. Have you had conversation with many upon this subject?—With a great many, everybody I could find. I think they would object to the powers of taxation being given to the present body.

1790. I presume that they would desire to be represented if they are rated?—They would consider that representation should go with taxation.

1791. Then supposing the authority were so constituted as that the landowners and residents in the valley of the Thames were fully represented; in your opinion they would have no desire to avoid taxation, but, in fact, would rather wish to be taxed for the purpose of preventing the floods?—Yes; I am speaking now of

*Chairman*—continued.

the agricultural interests. I do not speak for towns at all, I confine my remarks to the agricultural interests. They also think that the sum derived from the waterworks belongs to the upper Thames, and the net income derived from pleasure traffic.

1792. By the Upper Thames you mean the Thames above Teddington Lock?—Yes, above the tideway.

1793. Then, supposing that this Conservancy authority properly represented landowners and agricultural interests, are you of opinion that one authority should be constituted, or that there should be two or three over the whole valley of the Thames?—I am inclined to think that one authority would be better than a great many, because it would be cheaper, and because the present Conservancy Board has all the staff and appliances; but while saying that, I think that a thorough reformation of the Conservancy Board would be required.

1794. A re-constitution?—A re-constitution.

1795. What objection have you to the present constitution of the Thames Conservancy, in addition to landowners and the agricultural interests not being sufficiently represented?—They are persons, you see, in no way connected with the upper part of the Thames, or anything much above London. I except the two or three representative members which they have, as amounting to nothing. I think there are three.

1796. Then, supposing that several members were added, who would represent the interests of the Upper Thames; what do you say?—Then I think they might be made a very good body.

1797. And you think they would carry out the work satisfactorily?—Yes, they have most excellent officers.

1798. Is it your opinion, as far as your knowledge goes, that those owning property in the valley of the Thames would be willing to contribute for works ordered by such authority?—I think so. If you will allow me to make the remark, I think there seems to have been some doubt as to the frequency of the floods. The high flood was in 1852; then there was a long pause, and then they came on almost annually. That was not an accident. I believe these floods will be chronic, on account of the improved state of the drainage in the country, and the inadequacy of the Thames to carry it off, as at present constituted; but I deny that these floods are simply accidents which will not recur.

1799. Then you believe that they are more frequent now than they were, owing to the increased drainage?—Oh, I am sure of it. In the Shepperton Valley there were nine feet this year upon my gauge above summer level. Anything above six is very damaging.

*Sir P.  
Colquhoun.*

15 June  
1877.

Monday, 18th June 1877.

MEMBERS PRESENT :

Mr. Coope.  
Mr. William Cartwright.  
Colonel Carington.  
Mr. Charles Praed.  
Mr. Richardson-Gardner.  
Sir Charles Russell.

Mr. Walter.  
Mr. William Henry Gladstone.  
Mr. Hall.  
Mr. Watney.  
Sir Trevor Lawrence.  
Mr. Samuelson.

O. E. COOPE, Esq., IN THE CHAIR.

Sir JOHN HAWKSHAW, called in ; and Examined.

Sir J.  
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Chairman.

1800. You are an Engineer of many years experience, I think ?—Yes.

1801. And have undertaken many large engineering works ?—Yes.

1802. If I am not mistaken, you have just completed a large work at Amsterdam ; a ship canal ?—It is nearly completed ; the canal has been opened for ships of 17 feet draught, but it will ultimately be large enough for ships drawing 24 feet ; it will take about 18 months' more to get it to its full depth.

1803. Have you directed your attention to the floods in the valley of the River Thames ?—No.

1804. You are aware that periodically the valley has been subject to being flooded ?—Yes.

1805. We are desirous of getting professional information as to the best means of mitigating or remedying these floods if it be practicable ?—To give any information on a subject like that, I should have to get at the facts and study the river, which I have not done. I was applied to some time ago by the Thames Valley Drainage Commissioners, and I met them once at the Inclosure Office in St. James's-square, but that was to ascertain from me whether I should be willing to advise them, in case they desired it, but nothing further came of it. I think they decided to postpone further operations until this Committee had concluded its investigation, so that practically I did not either look at the river, or go into any of the questions which refer to it.

1806. Are you of opinion that the embankment of the River Thames, and contracting the size of the area, would contribute to the flooding above that embankment ?—That is scarcely a question I should answer off-hand. I was applied to by the Metropolitan Board of Works, who had a Bill in Parliament, and they wished for my services with reference to that Bill, to examine the quays and banks of the River Thames within their jurisdiction, but my engagements would not permit me to do so ; so that I have not gone into the question. You cannot give opinions upon these questions without investigation. Every river has its own peculiar *régime*, and they all vary. There is no method of treating rivers which applies to every river.

1807. But these are questions which, I think,

Chairman—continued.

have come under the consideration of the Institute of Engineers ?—Yes ; and if I were to express an opinion off-hand, it would not appear to me that the Thames Embankment could have had any material effect upon the floods ; for instance, supposing it to be, as is stated, that the river is more contracted below the embankment than it is where the embankment has been put, I do not see that it could affect the floods of the River Thames very much ; the only way it would operate would be taking away a small portion of the water space, and that applied to the whole area or cubical contents of the River Thames, would be so small as not to have much effect, I should think.

1808. Are you of opinion that the land drainage would contribute to it ?—Whenever you straighten a river course, or brook course, and enable the water to pass down with greater rapidity, and whenever you carry out arterial drainage, and enable the water to pass to the brooks with greater rapidity, you bring down in the same time a larger quantity of water, and thereby increase the magnitude of the floods ; that would apply to any river.

1809. Would you consider that the weirs on the River Thames, especially if they have been raised in height, would add to it ?—Yes, I should say that weirs, as a rule, either in the River Thames or elsewhere, are simply obstructions to any water-way, and, *pro tanto*, they obstruct the water-way, and increase the tendency of the water to overflow the banks of the river.

1810. And if the weeds are not cleared away, or the little islands allowed to increase, they will also form obstructions ?—They necessarily obstruct the flow of water, and make the water, therefore, more liable to overflow the banks of the river.

1811. In fact, any obstruction to the flow of water would do that ?—Yes, you may look at a river as a trough, for the general principles involved in these questions are simple. If you make a trough, which is a foot square, a foot deep, and a foot wide, with a given fall, it would carry a certain quantity of water ; but if you put into that trough an obstruction of any kind it obstructs the flow, and would cause the water



*Chairman—continued.*

water to pass over the sides of the trough; therefore, anything like weeds, mud banks, shoals or weirs, all tend to obstruct the flow of the water down the river, and, *pro tanto*, to increase the floods.

1812. Have you ever considered the question of the water supply to the metropolis as derived from the River Thames?—No, I have never considered it further than hearing it discussed at different times; but I have never gone into the question with any view to form a definite opinion upon it. I hear the discussions about it from time to time, but nothing beyond that.

1813. Supposing, with a view to diminish the floods, and at the same time improving the water supply to the metropolis, it was felt desirable to make impounding reservoirs; what is your opinion upon that point?—There is no doubt that if you were to make at the upper reaches of the River Thames impounding reservoirs, into which you take the flood-waters in times of heavy rains, and there store them until dry weather, you would so far diminish the magnitude of the floods; it is obvious that it must be so.

1814. Such a work would involve a considerable outlay, I presume?—No doubt, but it is an outlay that some day may have to be incurred by somebody. In course of time, I suppose, the water supply to London will get short, and it will have to be increased either by impounding flood-water in reservoirs in the upper part of the River Thames, or by going to some more distant point; of course that will become a question of expense and comparative cost, and that is to be considered.

1815. I think I understand that you are quite of opinion that, looking ahead, it may be necessary to make impounding reservoirs to catch the flood-waters, or to seek for an increased supply to the metropolis elsewhere?—I should think so. But I am not attempting to assign any date to it; I do not know enough of the facts to say how soon that will be necessary, but it may be necessary in course of time. Of course there are some gentlemen who fancy that you can get a large increase of supply to London by sinking wells. If that could be done, it would render the necessity for impounding reservoirs less imminent.

1816. You are aware that a well has been lately sunk at Messrs. Meux's brewery 1,100 feet deep?—Yes.

1817. Are you aware whether that has been abandoned or not?—What I understand was, that whereas in the first instance they had a considerably supply of water, that by going deeper they lost that supply, or a portion of it, but that is merely hearsay; I do not know it of my own knowledge.

1818. It has been suggested by some witnesses that the floods in the upper part of the Thames might perhaps be obviated by cutting a canal from Ridge's Weir to Abingdon, saving that large bend in the river up to Oxford?—That is a work I could give no opinion upon without seeing the place.

1819. Have you any doubt that engineering skill would be able to battle with the floods in the Thames Valley?—I have no doubt about it.

1820. It is simply a question of expense?—A question of expense; there is no doubt at all that engineering skill can very much moderate the floods in the Thames, of course it will ultimately become a question of expense, for that is one of  
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*Chairman—continued.*

the considerations engineers are obliged to attend to. There are cases where you might do works which would have all the desired effect, but where it is impossible to do them simply from the fact of knowing that you cannot afford the expenditure.

1821. In fact it is a question whether the advantages to be gained will be commensurate with the necessary outlay?—Just so.

*Mr. Walter.*

1822. You have not studied the valley of the Thames with the view of ascertaining its capabilities for the construction of impounding reservoirs?—No, I have not.

1823. I presume that in all localities where impounding reservoirs have been formed, a great deal depends upon the configuration of the country, does it not; it is generally done by throwing a dam across the valley, is it not?—Yes.

1824. Do you know whether the upper valley of the Thames affords any facilities of that sort?—I could not speak to that. The flat valleys are more difficult, because you only get shallow reservoirs, and you have very long embankments.

1825. You could not go to a great depth?—No, the embankments might be very long, and I can give no information upon the suitability of the valleys.

1826. Do I understand it to be your opinion that the normal state of the river, that is to say, where there are no obstructions in the shape of canals and locks, renders it less liable to floods than any other state?—Yes, it is merely this: a river is a conduit which has to carry a certain quantity of water, and if it is not large enough, it simply overflows, and you make it smaller by obstructions.

1827. And therefore where locks and weirs are constructed, everything depends upon the way in which they are regulated in flood times?—Yes; you may construct a weir so that in flood times it would not be mischievous, that is to say, if you could then convert it into a sluice and open it entirely; in fact, for the time being, do away with the lock or weir, and make it into a sluice; that is done in some cases. There are weirs that I know which are weirs in dry weather, and in wet weather they are simply sluices; you draw all the paddles and the water flows freely.

*Sir Charles Russell.*

1828. Have you ever executed any works with the view to the prevention of floods, anywhere?—Yes, the Amsterdam Sea Canal which I am now completing had two functions, one was to make a ship canal from the North Sea to Amsterdam. Then as we destroyed two considerable lakes into which the whole of Rhine-land drained, we had to provide other modes of draining Rhine-land. Therefore that work, although primarily a ship canal, did involve large drainage works. I have also constructed works upon the River Witham, and I have been now for some months considering the question of the drainage of the River Witham with reference to the prevention of flooding in that river; my report was completed quite lately.

*Mr. Cartwright.*

1829. You said that you had not directed your attention to the floods of the Thames Valley, but that you had been in communication with the Thames Valley Drainage Commissioners?—Yes.

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Sir J.  
Hawkshaw.  
18 June  
1877.

Mr. Cartwright—continued.

I was requested to meet them, and the object of the meeting was to ascertain if I would undertake the work; they requested me to do so, and to advise them as to the best method of preventing floods within their jurisdiction. I expressed a willingness to do so, but it did not go further, because soon after there was an intimation that this Committee was about to be appointed, and these gentlemen thought they had better wait the result of this inquiry before they proceeded.

1830. Then, in point of fact, with regard to these Thames Valley Drainage Commissioners, you have had no relations with them except this one meeting?—That is all.

Mr. Watney.

1831. This getting rid of the floods is in a great measure a matter of expense?—Of course, that is always an important element.

1832. Have you ever considered the question about putting a rate upon the whole of the water-shed of the Thames?—I cannot be said to have considered it further than this, that I know that the Thames Valley Drainage Commissioners by their Acts (they have two Acts, 1871 and 1874, which I have looked through) have powers of putting a drainage rate upon certain lands, and also powers to do certain works, with the sanction, I think, of the Inclosure Commissioners; that is the usual mode; the Commissioners always obtain power to levy certain rates in order to cover the whole expense of the drainage.

1833. From the whole water-shed?—Not always; that varies very much. I have had cases where that has been the case. In the Fourth District, for instance, near Boston, works were carried out for getting rid of floods under my own direction, and there they agreed among themselves, and the whole land was rated, not only what is called the low land, but the high land above was rated.

1834. In the fens in Lincolnshire?—Yes; it is not always the way, but it is the case in that particular district.

1835. The reason is supposed to be that the low lands carried the water off from the high lands; that they are all benefited, and all ought to contribute to the expense?—Yes; and I think it is equitable that the lands which sends the waters down on this low land should contribute to some extent to the expense.

1836. Especially as the high lands send the waters down so much quicker than they used to do?—Yes.

1837. Is it your opinion that the expense would be so great, that it would be impossible to do anything with the Thames?—I should think not; but I cannot speak with precision, not having examined the Thames or considered the works. I am not able to speak as to what would be the expense, but there is no doubt that at an expense which would be worth the while of the parties interested, you might ameliorate the floods. Of course there is a question of degree in all these matters. I am speaking now upon general principles. Supposing some one were to say to me, "We want you to deal with the Thames so that there shall never be any flooding at all," I should say at once, without having gone deeply into the question, that it would necessarily lead to works of very great magnitude and very great

Mr. Watney—continued.

expense; and it might lead to works of such magnitude as to render it prudent to say you must not attempt to prevent the floods entirely, but you must do such works as will render the floods less disastrous to the property; therefore it becomes at last a question of expense.

1838. That is practically all that would be required, I suppose?—That I cannot say; of course as an engineer I could undertake to do such works as would do away with the floods altogether; but then it would require a very large expenditure, and the parties interested might say, we will be content with something less than that.

Chairman.

1839. You said that you had carried out works with the object of diminishing floods and removing drainage?—Yes.

1840. Have these works been successful and satisfactory to yourself?—Yes, and I am happy to say that, in the particular district I have just spoken of, the Fourth District, in the neighbourhood of Boston, they have not only been very satisfactory to myself, but also to the parties who found the money; in fact, they have answered perfectly in that particular case.

1841. And as regards the drainage of that large surface at Amsterdam, has that also been successful?—Yes.

1842. And has given full satisfaction to the town of Amsterdam?—I think so.

1843. The municipality carried out those works, I believe?—They were carried out partly by Government and partly by the municipality of Amsterdam; it really is Government work, and we were obliged to provide works which would prevent flooding.

1844. Any means that are taken to relieve the floods in the upper part of the Thames, thereby bringing the water down more rapidly, might have a tendency to flood the lower parts of the river?—That is possible. If you bring the water from the upper parts of the river faster, that larger quantity of water coming in the same time, would have an effect which it would not have if it came in double the time.

1845. Under those circumstances, are there any better means, so far as the waters of the upper Thames are concerned, at the same time, with the view to the water supply, than those impounding reservoirs. That I should not like to give an opinion upon; I mean it would require an investigation of the whole question. At present I have no idea what it would cost to make impounding reservoirs.

1846. Upon that I should just like to ask you your opinion. I will read to you one paragraph from a report of the Thames Conservancy, with a view of obtaining your rough opinion upon it: "Let it be assumed that, in order to raise only one inch of rainfall over 3,944 square miles forming the catchment basin of the Thames above Kew, these reservoirs were to be constructed along the course of the Thames westward of Teddington; if each reservoir were 15 feet deep, it must be three-and-three-quarter square miles in extent; even supposing the necessary land could be procured, the cost of this land, and the formation of the reservoirs, would amount to at least a quarter of a million sterling for each reservoir?"—Well, there is no doubt that upon the conditions which are there stated, the works would be of very great magnitude and very great cost.

1847. Have

*Chairman*—continued.

1847. Have you seen this report before?—No, I have not.

1848. Does it appear, in an engineering point of view, that the amount there is too large, or not sufficient?—I could not venture to give an opinion upon it, not knowing what the reservoirs are, what they are like, what is their shape, or what is the character of the ground upon which they are to be put. It would be quite impossible for me to give an opinion.

*Colonel Carington.*

1849. What description of works were carried out at Boston to prevent the floods?—At that time I was requested to report upon large works which would serve a very much larger district, and then I was also asked to report upon works which would serve this particular district, supposing the other districts were not united, and therefore I gave two plans, but the others did not unite; so I recommended the Fourth District to carry out their own works. They consisted simply in this, they had not fall enough into the Wash to prevent their lands being flooded, and I put across a drain which leads to a sluice, a lock and sluice and pumping power, and lifted the water five feet, which was the same thing as giving them five feet more fall, and the effect of this was, as it gave them five feet more fall, it drained the land perfectly, and they have never been flooded since.

1850. Did not the farmers complain at all of the damage done to their land by the absence of the flood water?—No, the farmers are delighted; and I am told that pretty nearly the whole expenditure was saved in the first winter. I suppose you may sometimes over-drain land; at least farmers say so; it sometimes comes a very dry season, and then they say there has been too much drainage; but they forget the wet season, and, taking it altogether, I am not aware of any mischief that has been done by drainage myself. I do not mean to say there has not been some, but I have not heard of any.

1851. How many miles of river do these works affect which you carried out at Boston?—They did not affect the river at all; they drained into a drain which has a sluice into the sea at Hobhole, a large drain leading to this sluice, and there are about 80,000 acres affected by these works. The river was not enlarged which led to the sluice, it was simply putting upon it sluices and pumps, so as to lift the water from one side of the doors to the other side, and, of course, lifting the water five feet high it flowed into the sea when it would have been closed by the sea doors. It was just the same thing as giving them five feet more fall; but all these questions are to be considered separately.

1852. What would affect one river does not affect another?—No, you cannot lay down general rules; every river must be studied by itself, and dealt with accordingly; there is no general principle to be laid down.

*Chairman.*

1853. Some witnesses have suggested that, by means of telegraphic communication along the river, the Thames Conservancy might control the floods, by rapidly transmitting orders to the different gate-keepers to open or close the weirs; what is your opinion upon that?—That I could

*Chairman*—continued.

not tell unless I knew the character of the weirs; if the weirs admit of being converted absolutely into sluices immediately, they might do a great deal of good, but whether the weirs do admit of that I do not know; it is impossible to give an opinion upon that without examining each case.

1854. Supposing the objects to be gained were so desirable, and the interests concerned so great that works could be carried out which would prevent the injury of property from floods within the valley of the Thames, what should you say?—No doubt that would be desirable; of course, to prevent it entirely might require a very large expenditure, but to prevent it to a great extent, might be done by a smaller expenditure; I cannot undertake to say to what expenditure it would be prudent for the parties interested to go to, but it is practicable, no doubt, at some expenditure, to get rid of the floods, or, at a less expenditure, you may very much ameliorate them; which of these plans it would be best to follow, without investigation, I cannot undertake to say.

1855. Without doing away with them, to remedy excessive floods?—Yes.

1856. And that might be done without very heavy outlay, you think?—Well, "heavy" is a relative term. It would not be, very likely, heavy in my estimation, but how heavy it would be in that of the parties who had to find the money I cannot tell; but all these things are questions of degree. In Holland, of which I know a great deal, they have not succeeded entirely in getting rid of the floods; all they have succeeded in doing is getting the water off the land with more or less rapidity, and their country is so flat, that, to a certain extent, in some parts of it they are obliged to let the water flow over the land, and then they get it all off as soon as they can. They are now considering going to a still greater expense to diminish this flooding; but they have no means of doing it, except by putting down large pumping power, for instance, in one of the most famous sluices in Holland, through which the water flows into the North Sea; sometimes with peculiar winds that sluice is shut up for two or three days, and then the lands are flooded. They are now contemplating putting down very large steam-power indeed to get rid of that flood; that is, to pump the water into the sea when the sea is so high that it cannot run into it.

1857. I suppose your attention has been drawn to these large draining works at Harlem Lake?—Yes.

1858. Are those works successful, so far?—Quite.

1859. And the surface of the lake is no longer subject to floods, or, at all events, the pumping power is equal to battle with the floods?—Yes, the land is now entirely cultivated; there is no flooding. That is one of the drainages I have incidentally had to do with. The pumping engines did pump the water off that drained land into Wijkermeer, that we have converted into dry land in making this canal, therefore we have to provide means of getting the water pumped out of Haarlem Meer, as well as the district of Rhine-land (which is about 300,000 acres altogether), into the sea.

Sir J.  
*Hamkshaw.*

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Mr. WILLIAM EDWARD SAKER, re-called; and Examined.

Mr. Saker.

Chairman.

Mr. Walter—continued.

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1877.

1860. I BELIEVE you are anxious to make some addition to your evidence?—I thought it might be acceptable to the Committee, if I were to offer some suggestions upon the lock part of the question, as regards the improvement or amelioration of the future management. I have thought it over a little, since I was examined, and it seems to me that a very useful proceeding would be to give a sort of acknowledged standing to the riparian owners and millowners from one reach to the other, so that they should, as it were, be induced to have a concentrated interest in that one reach, and concentrate it on the flood lock at the lower end of the reach.

1861. You would invite the authority then?—No, I would simply make a sort of acknowledged local authority, that is all, which really now is not acknowledged. Hitherto it has been people above the lock who might be found fault with, or considered as rather injurious and troublesome if they gave any unasked-for advice about a certain lock. I know it would be useful, and I think the riparian proprietors and millowners would fall into it very easily, and would make a sort of local board, or you might call it a court leet if you will, to insist on a right of way for the flood waters that molest them, through the lower flood locks of that reach.

1862. You are still of opinion that one general authority is desirable, but you would wish that there should be local boards established along the course of the river?—Quite so. They seem to me to be self-established, as it were, now, only that they would have a concentrated effect upon, we will say, the Thames Conservators. I have no wish at all to offer any observations as regards the conduct of the Thames Conservators, because I really do not think you could have a better body, although you might perhaps extend it; but these local boards might be acknowledged as a means of pressure, to get rid of the flood-water which injured the property within the reaches; when I say within the reach, I mean between the two locks.

Sir Charles Russell.

1863. But is there anything to prevent their doing that now?—No. I can quite understand that you would say it exists now, and, so to speak, it might exist, and it has existed as individuals, but not, as it were, an acknowledged body that could put their weight upon the thing that injured them most; that is the insufficiency of the outlets of the lower flood-lock upon that reach.

Mr. Walter.

1864. I understand it to be the duty of the Thames Conservancy to attend chiefly, though not exclusively, to the navigation and the impurities of the river?—Yes.

1865. They are not at all concerned with the floods as injuring riparian owners, are they?—I cannot help considering them as having something to do with it. If I understand the last Act of Parliament rightly, they have the entire control of all the locks and weirs on the Thames.

1866. But for what purpose?—For the purpose of repairing and keeping them in order.

1867. That is for the purpose of maintaining the navigation, not preventing or controlling floods?—I should think it was for both. I may be wrong in that respect, and I should hardly like to express the limits of their authority, because I do not know it; but it seems to me that the late Act of Parliament has put into their possession the authority over the whole of the locks of the upper district of the Thames, and that this sort of local boards, if they were allowed, and could be sanctioned (and I think they would bring themselves into existence), would have a sort of central pressure, and a very effective pressure, upon that body.

1868. But if the duties of the Thames Conservancy Board comprise all the interests connected with the Thames, what do the duties of the Thames Commissioners comprise?—The Thames Commissioners' duties ceased since 1864. Some people might say, and you might suppose, that these local boards which I am speaking of would have nothing to do, but if they were acknowledged as local bodies, as you might acknowledge the parishioners of a parish, they could and would soon be brought together, and would have a pressing effect upon the Conservators, or whoever had the duty of putting things to rights, to augment the convenience of output at the lower flood-lock, which is the cause of the floods in the immediate reach above it.

1869. Do you think it ought to be the business of the Drainage Commissioners to keep the Conservancy Board up to the mark, in attending to the river so far as concerns floods, and the injury to the land occasioned thereby?—That I am not competent to enter into; I do not know sufficient of the Drainage Commissioners; but now I am speaking of the locks below Reading; I cannot carry my eye up to Oxford, and that way, because I do not know much about those districts, but what is applicable to one lock and reach should be applicable to the next. I would have the millowners at the upper end of the reach have something to say down to the next flood-lock below, because it is that lock by which all the reach above is considered to be injured. Hitherto, as you are probably aware, the locks have been the property of private owners until a recent Act of Parliament took them away, and now, I presume, they are in the hands entirely of the Conservators of the river. Then, I think, there is another view of it which you may take. If you look favourably upon such an arrangement as that, I think you will also look in that direction for, I may almost say, most of the funds which may be necessary to increase the output at that particular flood-lock. I do not think it would be a troublesome affair if such local boards, I will not say could be constituted, but could constitute themselves, with your assistance, for them to point out a way of raising the first monies for giving more outputs to the flood-locks.

1870. Are you at all acquainted with the history of the locks on the Thames; when they began, and by whom they were put up; when they were first formed?—No, only that the late owner of Shiplake Mills, which I have, Dr. Phillimore was the owner of what they call the back stream, or flood locks, embankments, and weirs,

*Mr. Walter*—continued.

weirs, for reparations and to keep up which he was at great expense, and when I took the mills of him, it was a generally understood thing that the repairs of the weirs, and the rest of it, cost more than they could get from the rents of the mills at that time. Now, those expenditures have been taken off the old lock and mill owners, and I certainly do think that if this thing could be looked at, at all favourably, there would be some sort of consistency in these people, who have had so much responsibility taken off their shoulders, putting their shoulders to the wheel, to enable the lower flood lock of the reach to take away the water which flooded the lands above it.

1871. Do you understand that the locks were originally put up for the sake of the mills, or that the mills took advantage of the locks, and were established subsequently?—I should say decidedly that mills were established first, and subsequently, in most cases, removed to be re-established nearer to the pound locks, when the pound locks were first made. I have known them 25 years, and known people who recollected them 50 years.

*Chairman.*

1872. Are you aware how long your lock has existed?—A hundred years, I should say. I only go from knowing the locks' man, who died 10 or 12 years ago; his father before him was there, and I should think it was 100 years since the first lock was established, but I merely go by hearsay.

1873. As a miller, whose property suffered from injury by the floods, would you be willing, supposing works were necessary to be carried

*Chairman*—continued.

out to prevent those floods, to have your property rated for that object?—I may tell you what I would do; and I will give you my reasons. I consider that I lost 500*l.*, to say the least, during and by the last year's floods. Now it would not be a very great stretch of liberality in me if I were to contribute 100*l.*, or perhaps a little more, towards finding what was necessary for the enlargement of the flood-locks at the lower end of our reach of the river. There can be nothing more certain than that a large portion of the flood-locks are too small, they have not got the cubic capacity to take away the water that comes down in high floods into the lower reaches, and I think I am not wrong in saying that in Mr. Leach's letter, or some evidence which he gave at the time this Act came into operation, in 1864, as his firm opinion that there was ample capacity in the river to receive all the flood water, and convey it away, if it was allowed to go through; and he then gave it as his opinion that it was on account of the absolute imperfection, as far as regards the outlets, and other things, of the weirs and locks which was the cause of the floods. That was his evidence in 1864, and if he looks at it now I do not think he has any reason to alter his opinion which he gave then. Perhaps you would allow me to put my ideas on paper and send them to the Chairman?

1874. We shall be very happy to receive them?—And any question which you might wish to ask me about what I have said, or anything in which you might see that a hole is likely to be picked, I would answer.

**MR. STEPHEN WILLIAM LEACH, called in; and Examined.**

*Chairman.*

1875. I BELIEVE you fill the office of Engineer to the Thames Conservancy?—Yes, I do.

1876. For how many years have you been in that position?—Upwards of 35 years.

1877. During that time have you been employed by the Thames Conservancy to carry out the works, particularly with the view to maintaining the navigation?—Yes, I have.

1878. Another object you have also of late had to bear in mind is the purity of the river?—Yes.

1879. As regards the necessity of remedying, or modifying the floods, that has not been within your work?—Yes, it has. When the Act of 1866 passed, the Conservators of the River Thames directed the late Mr. Beardmore and myself to report upon what was required to be done throughout the navigation, which had been just then assigned to them. We made a thorough examination of the river and reported, and one of the objects to which we called their attention was the providing greater facilities for the escape of the floods. From that day to this, my attention has been directed to that.

1880. Have you any doubt in your own mind, that by engineering works, putting aside the expense of those works, that the floods in the valley of the Thames are preventible?—I do not think they are preventible, but I am very sure they can be mitigated.

1881. So that the injury to property would be very much less than it is now?—Just so.

O.114.

*Chairman*—continued.

1882. On your reporting the necessity of providing such means in 1866, to the Conservancy, what steps did that Board take upon that report?—In the course of that report the works which first demanded attention were detailed, and the Board directed that these works should be first undertaken. They were principally the repair and restoration of locks which were in immediate danger of giving way; those were the first things which we undertook.

1883. That was with the object of maintaining the navigation?—It was so.

1884. And had no reference whatever to floods?—Yes, at the same time we recommended that these locks, which had to be rebuilt, should be built at a very much lower level than those then in existence, the object being to allow the dredging of the bed of the river so as to facilitate the escape of floods, and, in carrying out these works, we have done so. The first we recommended to be done was Bell Weir Lock. We built the bottom of that lock 3 feet 6 inches lower than the old one had been.

1885. Where is the Bell Weir Lock?—Just above Staines; and we have adopted that principle at several of the locks which have been rebuilt, all having reference to the escape of floods.

1886. Then I understand that, since 1866, in consequence of your representations, several of the locks have been lowered?—Yes, certainly.

1887. Has the river been dredged?—Yes, it has.

*Mr. Saker.*

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*Mr. Leach.*

Mr. Leach.

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Chairman—continued.

has. Nothing like to the extent we recommended it should be done; but the simple reason for that has been that the funds were inadequate. I have a model here which will explain. It is a model of Goring Lock and Weir, and I have also a plan of it. (*The Witness explained the model and plan to the Committee.*)

1888. As I understand from your explanation, you were not able to carry out the works which you considered needful, owing to apprehended opposition on the part of the millowners?—Quite so.

1889. Now, you stated that the Conservancy have not been able to carry out all the works which their engineer reported as necessary for improving the state of the river, owing to the want of funds?—That is so.

1890. Are the tolls increasing or diminishing?—Rather diminishing than otherwise.

1891. Have the Conservancy thought of any other means of raising their revenue?—Not that I am aware of.

1892. Nor have they any means of doing so?—No, not in the existing state of the law; certainly not.

1893. But supposing that a new power were imposed upon them, to mitigate the funds for the benefit of the landowners, and the landowners were willing to be rated for that purpose, then do you feel that with sufficient funds you would have the river entirely under your control?—I think so.

1894. When I say entirely, I mean in mitigating the floods?—Quite so.

1895. With the present works which you have, do you feel that all has been done as far as your funds would allow, in mitigating the floods?—Yes, I do.

1896. You do not think that more weeds could have been cleared away?—No.

1897. Or aits reduced in size?—No, I think not.

1898. And the river more dredged?—No, I think not. As to the removal of weeds the Conservators have done a good deal in that way. They have found that whenever others have undertaken the removal of weeds, for the purpose of regattas, and so on, the practice has been to cut the weeds, and let them float away. They have always sent their own men, and had the weeds taken out of the river altogether, and if that were done generally, it would be a very great improvement. The millers, for instance, are in the habit of cutting the weeds in their mill heads, and floating them away, the consequence of which is that these weeds catch upon the shallows and so on, and create a considerable nuisance.

1899. Were you more in funds, you would expect that your Board would carry out more works on the river for the purpose of mitigating the floods than they do at present?—I am certain they would.

1900. It has been suggested that supposing there were telegraphic arrangements along the river, that by giving speedy orders to the men in charge of the locks and weirs, the floods might frequently be mitigated; is that your opinion?—No, it is not my opinion. I believe that when an overwhelming flood is coming down the river, it would only mitigate it perhaps for an hour or two; supposing everything were taken out of the weirs, in anticipation of that, it would only give relief for a very short time.

Chairman—continued.

1901. Supposing the landowners and others interested on the banks of the river were to contribute considerably to the funds, then you feel that works might be carried out, which would very materially mitigate these floods?—Yes. I think that in the report that Mr. Beardmore and I made in the year 1856, we recommended that dredging which would cost about 29,000 l. should be executed. That return which you have had shows that dredging only to the amount of between 3,000 l. and 4,000 l. has been done, so that there is a vast amount of that dredging which yet is to be done, and which would be done if the funds were adequate.

1902. Are you under orders at the present time to carry out any more dredging work?—The extent to which we have the means of dredging is so limited, that I am obliged to confine it only to removing those shoals which are really obstructions to the navigation.

1903. Has your attention been drawn to the formation of impounding reservoirs to carry away the water in the upper part of the river?—Yes, it has. I have given a great deal of thought to that.

1904. Was this paragraph which I read to Sir John Hawkshaw, drawn up under your advice?—I did not hear it.

1905. I thought you were in the room?—No, I was not.

1906. That it requires six reservoirs 15 feet deep, three and three-quarter square miles in extent, and each reservoir costing about a quarter of a million sterling?—Yes; that was the result of my calculation.

1907. That would be one million and-a-half sterling for six reservoirs?—Yes; and that would only take off about one inch of rainfall when the ground was thoroughly saturated; one inch of rainfall over the whole catchment area of the Thames. I do not think that these reservoirs would be a source to be relied upon for the supply of water; and for this reason, that when a year comes, when the rainfall is only perhaps 15 or 16 inches in the course of the year, they would fail; and if we relied upon the quantity of water which they would yield, we should be completely deceived. There are years when the reservoirs would not be full.

1908. But they would always answer their purpose so far as the supply of water was concerned in years of flood?—They would; but at the same time they would be inadequate to take off such floods as we have had these last two years. After they got full, of course the flood would go on as badly as ever it has done.

1909. You feel satisfied that the Thames Conservancy have used every diligence in maintaining the navigation of the river, and, as far as they could, in preventing floods, and have only been stopped by want of funds?—Yes, that is the case. When the jurisdiction over that part of the river passed into the hands of the Conservators, there were 35 locks in that part of the river. I may say that almost every one of those locks was in a state of ruin; now we have managed either to rebuild or repair all except two. We have done that at a cost very considerably below what was estimated in the first instance, therefore I think that that is a result which is satisfactory to the management of the Conservators. At the same time, they have built two new weirs, and they have rebuilt several old ones.

*Chairman*—continued.

onces, still keeping materially within the estimate which had been formed; and with respect to those weirs which they have built, to show that they have not been forgetful of getting rid of the floods, I will mention these two; one is at Clifton Hampden, and the other at Old Windsor. We have evidence that at Clifton stock can be kept on the land for a very considerable time above the weir, beyond what it could be before that weir was built. We have managed to enlarge the waterways considerably, and so to reduce the height of the flood. We did the same thing at Old Windsor; that was done jointly at the expense of the Conservators and of the Crown. It was considered very desirable that floods should be prevented from rising as high as they had been in the habit of doing in the Home Park, and therefore we provided additional space for their escape; and, upon a comparison of the height of the floods, we came to the conclusion, and I think there is no doubt at all about it, that the floods in the Home Park had been relieved to the extent of about 18 inches. I refer to the ordinary floods; I do not refer to such as we have recently had, which were overwhelming in every respect, but we ascertained, from observations previously taken, that the height of the flood was diminished about 18 inches.

1910. You explained to the Committee what the Conservancy has done with regard to locks, and also as regards dredging; but, as regards the weirs, we should like to have a little information?—I have said that two new weirs entirely have been built; several others have been, in point of fact, so far repaired that you might almost call it a rebuilding. Take the case of the one at Romney; we found a lock and weir leaking so much that there was, I was going to say, hardly any river left at Windsor in dry seasons; we rebuilt the weir in fact, and we rebuilt the lock, and the effect of the two has been that the river now is kept full in summer time; and in rebuilding that weir, we were also able to make larger openings for the floods to escape. I do not know that I need trouble the Committee with details, but in the report to which you referred just now there is a detail of all that was done.

1911. Eleven weirs have been repaired, I think?—Eight have been rebuilt and 12 have been repaired; that is to say, substantially repaired; of course minor repairs have been carried on at every one of them.

1912. At the cost of above 10,000 £?—Yes.

1913. Now as regards the bridges across the Thames, what do you say?—Those are structures over which the Conservancy have no control at all; but I was struck when one witness was giving his evidence the other day, the Mayor of Maidenhead, that no reference was made whatever to Maidenhead bridge, for if it had been designed for a dam in the river, it could not have been more successfully done.

*Sir Charles Russell.*

1914. You mean the old bridge?—Yes.

*Chairman.*

1915. When was that built?—I do not know; it must have been in the last century, I should think.

1916. Has your Board represented to the authorities at Maidenhead the great objection to that?—No, they have not.

0.114.

*Chairman*—continued.

1917. That would scarcely be within their province?—It would be, I am afraid, rather a hopeless thing.

1918. You can give the Committee some opinion as regards what has been done for the purification of the waters of the river?—Yes, the Act of 1866 required that the passage of foul matter into the river should be stopped, in every place where it could be detected. I have had myself a good deal to do with reference to that, and I believe that notices have been served in the case of every single drain which discharged into the river. In many cases that has been done with good results. Oxford, for instance, was really in a shocking state from the passage of drains; that evil has been most vigorously grappled with by the authorities of Oxford; Abingdon in like manner. The Conservators in that case were compelled to threaten legal proceedings, but ultimately the mayor and corporation took the matter up vigorously, and they have now, I believe, just upon completed their plan for the diversion of the sewage. Reading has done a great deal in that way, and gone to a very large expense; Windsor also. Then there have been several other places where, in consequence of the action of the Conservators, the outlets of the drains into the river have been stopped. I fancy that has been accompanied with most deleterious results to the towns themselves. I could mention one or two where I am told that the wells have been poisoned by the cesspools, but at the same time the passage of foul matter into the river is stopped. It is not entirely stopped at Oxford at present, or at Windsor, but it will be very shortly.

1919. We have had evidence that at one or two of the towns in flood times the floods have reached the irrigation farms?—Yes, that has been so. At Oxford, it is impossible; the farm is placed so high that the floods cannot reach it. At Reading, a portion of the irrigated ground is reached by the floods, but there is a part which is high enough to avoid them altogether, and I believe it is the intention of the authorities to put the sewage upon that part of the farm in flood times. Maidenhead I am not so well acquainted with. It has been stated that a portion of that has been under the influence of floods.

1920. But as far as the action of the Thames Conservancy is concerned, nothing has been left undone, according to what you state, to carry out the entire purification of the river?—Nothing, I believe, has been left undone.

1921. And, in the event of any drainage being ascertained to exist in the river, notice is at once given to the parties to stop it?—Immediately. I was going to say, I am afraid that is the reason of some of the unacceptability which has been described as attaching to the Conservators. The fact of giving these notices to people has raised up a great deal of ill-feeling.

1922. Do you consider that the unacceptability of the Thames Conservancy in the upper part of the Thames is more due to the fact of the Conservancy having taken these active steps for purification than it is to them neglecting the works necessary to check flooding, and to keep the river in proper order in the upper part of the district?—I think so.

1923. Colonel Harcourt gave evidence that the Thames Conservancy had neglected their duty

*Mr. Leach.*

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Mr. Leach.

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Chairman—continued.

duty in the upper part of the Thames, and that the outlay there was very trifling, and that great expenses had been incurred in the lower part of the river?—That is so. No doubt where there was a traffic already in existence, the object of the Conservators was that that traffic should be encouraged rather than otherwise. In that portion of the river in which Colonel Harcourt is interested that is not so; practically there is little or no traffic there, and not a great deal has been done in that part of the river, although more, I think, than Colonel Harcourt gave credit for. There is another thing which I should like to mention with reference to that, which is that we have been deterred a good deal by the non-action of the Thames Valley Drainage Commissioners. We have felt, on many occasions, that it was useless to put any substantial works when they would have to be removed if the level of the river was altered by the Thames Valley Drainage Commissioners; it would have been simply throwing away money; that has deterred us in several cases from carrying out works. I can mention several instances where that has been done, and it is more to be regretted, because I do not think there was any occasion for all the delay that has occurred with those Commissioners.

1924. Some witnesses have told the Committee that the whole of the jurisdiction of the river had better be placed in the hands of these Drainage Commissioners than the Thames Conservancy. I presume that is not your opinion?—No, it is not, and if the Committee will look at what has been done, I think they will find that the Conservators have done fully as much as Parliament required them to do, perhaps I may say more, while the Drainage Commissioners have done nothing, or next to nothing; therefore I think it speaks for itself, that the Conservators manage matters better than they do. A great deal has been said about the time which was occupied in making a plan of that district. The plan which has been made is a beautiful one; one cannot speak too highly of it, but it was a plan simply for rating purposes. As far as I can form an opinion, there was no reason whatever why these Commissioners should not have gone on with designs for their main drainage works while that plan was in progress; I cannot conceive that six years need have elapsed and they should still be without any plan whatever for the general drainage.

1925. You consider, then, that the Drainage Commissioners have not shown due activity in carrying out works, instead of confining themselves to the survey of the district?—Quite so.

1926. Upon that question I should just like to know your opinion as regards the system of rating which has been adopted; is it a just and equitable system of rating the property that is under the influence of the floods, or five feet above high-water mark?—No, I do not think it is to rate the land only. Reference has been made to a plan which was prepared by Mr. Beardmore and myself for mitigating the floods in the neighbourhood of Oxford. We prepared a plan which we were enabled to say would result in the lowering of the water over the whole of the surface flooded from two feet six inches to three feet. We contemplated that that was an expense which would so directly benefit Oxford, that it would be nothing but fair that the colleges, and even the

Chairman—continued.

city itself, should contribute towards it, and it really would be a very small burden. Suppose that the carrying out of this plan cost 50,000 £., we put it at 30,000 £., but suppose, for the sake of argument, that it cost 50,000 £., I think there are 24 colleges in Oxford, and if you divide the 50,000 £. by 24 you get 2,833 £.; that would be supposing each college were equally interested, which, I suppose, is not the case; but supposing each were so, 2,833 £. at 6 per cent. would be 170 £. per annum each college. Now, if for 170 £. per annum for each college, the plan described in this report were carried out, I think a remedy for the floods would be provided at a very moderate cost.

1927. Do you think that by the outlay of this 5,000 £. at the outside Oxford would no longer have to complain of floods?—I have no doubt about it.

1928. And it would only be at the cost of 170 £. a year for each college?—Yes, supposing them to be equally rated. That plan has been before the authorities now for ten years.

1929. It was submitted to them by the Thames Conservancy?—Oh, yes, both to the local board and to the colleges. It was suggested here the other day that Professor Phillips had some objection to it. That is the only time that I ever heard that any objection was made to it. The principle of it was simply to restore things to what they must have been originally, before weirs and dams were put into the river.

1930. You have repaired several of the locks and weirs in the upper part of the river, between Oxford and Lechlade?—Yes, we have.

1931. Are the locks and weirs now in a state of tolerable repair?—Yes, they are.

1932. Have you got that report which you spoke of?—Yes.

1933. Will you hand it in to the Committee?—Yes, certainly. I ought to qualify that last answer a little; I said the locks and weirs were in a satisfactory state. I cannot say so much of the weirs; these weirs must have been barbarous constructions some hundred years ago, and the Conservators have always had a decided objection to restore such barbarities as they are, and feeling, at the same time, that that part of the river must be dealt with by the Drainage Commissioners, and in dealing with it, that they would almost be obliged to make proper provision for navigation, it would have been throwing away money if the Conservators had spent any in restoring or renewing these weirs. They took away eight of them.

1934. Then these works have actually been delayed, and you feel the necessity of their being carried out by making new weirs?—Yes, but I am afraid it is rather questionable whether any considerable amount of traffic would come upon that part of the river; at the same time a great deal might be done, at no very great expense.

1935. Is the navigation of that part of the river now in as satisfactory a state as it was 30 years ago?—I should hardly think it is; some of the works are much better, but others are not; there is a space between Radcot Bridge and New Bridge, which was abandoned as a navigation, and, that being the case, we removed several of the weirs which were placed there, and that might be, perhaps, to some extent less navigable than it was formerly.

1936. We have been informed that in former years



*Chairman*—continued.

years a craft called "Brimstone," of 150 tons, used to navigate between Gloucester and London, by way of Oxford; is that practicable now?—No, it is not.

1937. What tonnage can now pass through the upper part of the navigation?—Through that part of the river, I should not think a boat could pass carrying more than 30 tons.

1938. And what draft?—At extreme dry seasons, I daresay not more than 2 feet or 2 feet 6 inches; of course, at other times it would be more, but that again I should explain is in consequence of one or two particular shoals which are in existence, and which we believe have been formed by the operation of some drainage works which were carried out several years ago; I think Mr. Bryan Wood, in giving evidence, referred to those works.

1939. Have you ever directed your attention to the idea of cutting a canal across from Abingdon to Ridges Weir, so as to cut off that reach?—Well, it so happens that the ground is very high, and therefore if anything of that kind were done, it must be by a tunnel, and that would be very expensive; that was a project which engaged a good deal of Mr. Beardmore's and my attention.

1940. And after paying it considerable attention you did not recommend it to the Conservators?—No, we did not.

1941. Neither would you now?—No.

1942. Now, having informed the Committee with regard to your works in that upper part of the Thames, will you be good enough to tell us what you have done below Staines, for instance?—There has been a great deal done there in the way of dredging, not being in the same difficulty as to funds as we are above. Although I found one of the witnesses saying that the Conservators have done nothing whatever in dredging, that is not the fact, they have done a great deal.

1943. I think that you have stated that your report went to the extent of recommending 29,000 *l.* to be spent on dredging, and you have carried out works amounting to 3,000 *l.* or 4,000 *l.*?—That was in the district above Staines.

1944. Now take the district below Staines?—Quite so. I was astonished to hear that evidence from Mr. Taylor, because he was a member of the Staines Local Board, when they purchased a large quantity of gravel from the Conservators, the result of dredging; he seems to have forgotten that altogether. We dredged the river for about a mile there. There are two or three other places where we have carried out dredging to the same extent, but below Teddington, where the river was in a very shallow state, we have expended something like 10,000 *l.* in dredging within the last three years; we have, in point of fact, opened a new river there, and that is very important, indeed, in getting rid of the floods. We have very undoubted evidence that below Teddington, if a flood equivalent to the one of 1821 had occurred, it would have been three feet lower than it was in the year 1821, in consequence of these works which we have carried out below Teddington.

1945. Therefore there is a much greater area in the river now below Teddington than there was before these works were carried out?—Very much greater.

1946. Do you apprehend that if you carried out works in the upper part of the Thames, by

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*Chairman*—continued.

which the flood-water could be carried more rapidly down the river, that the area of Teddington would be sufficient to carry it off?—Yes, I think it would. A few years ago Teddington Weir gave way; it was then 60 years old, and so it was not astonishing that it should give way. The Conservators then determined to re-build it, I may say, regardless of expense; they spent between 8,000 *l.* and 10,000 *l.* on re-building it. The contract for the greater part of it was very close upon 8,000 *l.*, and in addition to that, they had re-built a portion of it before at an expense of 2,000 *l.* The result of the different arrangement of the weir was that floods were considerably mitigated above it.

1947. Have you a plan of Teddington Weir here?—Yes, I have (*producing one*). This gives you an idea of it. There is a series of standards erected across the river in a diagonal direction. These are iron gates, which are made to lift entirely up from the bottom, so that as the flood rises, the man in charge at this weir has to raise these gates, and the floods pass off with very great freedom.

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1948. Did you not do something extra at Teddington; you made a fresh tumbling bay, did you not?—No; when this was carried out the whole thing was extended, and made capable of carrying off much more flood-water.

*Chairman.*

1949. Now will you be kind enough to tell the Committee what regulations you have adopted of recent years for the prevention or mitigation of floods?—These are printed directions which are given to every lock-keeper; he is directed "to telegraph any defect in the lock or gear."

1950. How is he to telegraph; are there telegraph communications?—To the principal office in Tower Hill.

1951. You have telegraphic communications?—By the ordinary telegraphs.

1952. But are all the locks within reach of telegraph stations?—Yes, they are; they are "to telegraph any defect in the lock or gear which requires immediate attention to the engineer, the superintendent, and the foreman of the district" (that is to three different people): "to take charge of the weirs and all appliances for penning up or passing water which do not form part of the working machinery of mills: to take charge of all the movable tackle and implements connected with the weirs and other works, and to keep such tackle always ready and fit for use, reporting any defects to the engineer or to the foreman of the district, or superintendent on passing: to draw or open in floods the whole or a portion of the weir tackle immediately the head of water raises to high-water mark, and to keep the tackle open so long as the water continues to stand higher than high-water mark, and to close the said tackle when the water subsides, so as to preserve the head of water as nearly as possible to the high-water level: to procure, subject to the approval of the superintendent, such assistance as may be necessary for drawing and shutting the weirs: to pay for such assistance, and take a receipt for the same, and deliver it to the superintendent;" and then any ferryman in the immediate locality of the lock is to assist.

1953. It has been stated that at some of the locks

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locks you employ women, who are scarcely able to do the necessary work?—In two cases women are employed, but in each case they have sons who are quite competent to do the work.

1954. And you are not aware that the work has been improperly executed in consequence of women being employed?—No.

1955. That has not come under your knowledge?—No.

1956. You are able to communicate with the lock-keepers, and they are able to communicate with you at head-quarters?—Yes.

1957. By telegraph?—Yes.

1958. Are they instructed to telegraph as regards floods?—No.

1959. Would it not be well that they should be instructed to keep you well informed at head-quarters during rainy periods?—I do not think that it would make any material difference. Simply as a matter of information, I have daily returns from some of the locks, such as at Oxford, at Reading, and at Windsor, but that, of course, has no reference to the management of the weirs. I think that if these regulations were carried out (and we should surely have complaints if they were not carried out), they are as efficient as anything can be to allow the flood-waters to be passed off.

1960. But in case of a flood existing in one part of the river, and the other part being sufficient to receive a considerable portion of the flood water, would it not be well that you should be kept thoroughly acquainted with the state of the river, so as to remedy any flood in that particular locality?—No; if the man carries out his instructions, the remedy is on the spot.

1961. You consider those instructions ample?—I do.

1962. You have a superintendent, I presume, who goes and sees that your wishes are carried out?—Yes. I should, certainly, if it could be done, advocate the extension of these tumbling bays, because they do not want looking after at all; as soon as ever the water rises it relieves itself, but there is a difficulty in the case of the millers in carrying that out.

1963. We have been told that these floods might be obviated by the adoption of self-acting weirs; what is your opinion, as an engineer, upon that point?—I have never seen any self-acting machinery that answered properly; I have tried it myself, and I have been defeated in the most unexpected manner.

1964. You have no confidence in what are called self-acting weirs?—No; but I have the utmost confidence in what I have just stated, that where there is a tumbling bay it is simply and purely self-acting; and I believe if the floods in the river are to be mitigated, it is to be done by the extension of tumbling bays.

1965. And that is what you recommend?—Certainly.

1966. But then we come to the difficulty of the compensation to the mill-owners?—Yes.

1967. How do you propose to meet the difficulty?—I do not think it need be a difficulty. In a case of that kind, supposing the tumbling bay were lower than it is at present, that inconvenience might be obviated by simply placing washboards there, which might be removed in the early part of the winter, and kept out until the floods had abated; that would give relief, to a very great extent.

Chairman—continued.

1968. So that you would have washboards at all times of the year, except during heavy rains, I understand?—No; we have them already at several of the weirs on this side of Staines; in the old jurisdiction belonging to the Conservators we have boards which are put temporarily to raise the head of water during the dry seasons, the whole of which are taken away when the water first begins to rise in the autumn, and they are kept out.

1969. So as to secure as much headway in the dry season as practicable?—Quite so. Then I should state that it is rather an expensive thing; it is not the mere putting a board across, but the whole tumbling bay has to be adapted to it, and it runs into a great deal of expense.

1970. Supposing you got over the difficulty of compensating the mill-owners, and carried out the system of tumbling bays to the fullest extent of your desire, do you feel, then, that the lower part of the river would fully carry off the extra flood water?—I think it would: as I have all along said, it would not prevent a very high flood from inundating the land, which you cannot hope to do, but it would be in operation as soon as the water began to rise, and it would continue in operation until it had fallen quite low.

1971. And by the time it came down here you would not fear the recurrence of the Lambeth flood, for instance?—That is quite a different question altogether; the flooding of Lambeth occurred owing to the tide coming in from the sea.

1972. Not from the flood waters?—They aggravated it, no doubt, but the main reason was the tide coming up from the sea. At the time that this great inundation occurred here, there was a high tide came along the south coast of England, and at the same time there was a northerly gale which drove the water down the German Ocean, and the two together forced a great tide up the estuary of the River Thames; it was certainly the case, as it happened, that the great tide was met by land water, and that made it still worse; but the principal cause of these floods was unquestionably the high tide at sea.

1973. Aggravated by the flood waters?—Certainly.

1974. But still by carrying out these works of tumbling bays you think it would really mitigate that evil?—I think if they were carried out the cause of complaint in the upper parts of the River Thames would be removed.

1975. Without much detriment, if any, to the lower part?—Without any detriment. I should, of course, qualify that by saying that it must be accompanied by dredging; it would be no use making tumbling bays unless you dredged the shallow part of the river.

1976. And cleared away weeds?—The operation of dredging I find does it more effectually than anything else; it lifts them up by the roots.

1977. And reducing the size of the aits?—Yes.

1978. The aits are an obstruction?—To some extent; but I think it has been magnified a great deal.

1979. Still anything which exists in the river, whether in the shape of land or buildings, must be more or less an obstruction, I presume?—No doubt.

1980. Such

*Chairman—continued.*

1980. Such an obstruction as the one you have instanced of Maidenhead Bridge?—Yes.

1981. The plan which you have prepared for reducing the floods is by extending the tumbling bays. Have you any other plan?—I have prepared a plan which would deal with the floods on this side of Staines. There has been a great deal of complaint about the floods there, and the Conservators directed me to prepare a plan, showing how they might be very much mitigated; and that I have done.

1982. Have you got a plan?—Yes, I have (*producing it*). Here is Staines; there is no question Staines is very much flooded, and the reason of that flooding in a very great measure is that tremendous turn which the river takes *here*; it is a downright impediment to the escape of floods. Some years ago the Corporation of London, when they had the management of this part of the river, made a cut across that neck, which has had a wonderful effect in taking off the floods. I now suggest that that cutting should be very much enlarged, which would afford a direct escape for the floods. I recommend that, as it would be useless to bring an additional quantity of water into this shallow part of the river, it would be necessary to dredge so much of it. I then go on to recommend that certain dredging should be done *there*. I then come to another of these awkward turns in the river, and I suggest that it would be useless to enlarge the area of the weir there, but that the proper thing would be a side-cut or a tumbling bay; but that brings an additional quantity of water into this very crooked part of the river, which operates, of course, to prevent its going off; and, in addition, the River Wey comes in *here*, which brings in a large quantity of water.

1983. What part is your finger upon now?—Weybridge. Then, in order to obviate that crookedness of the channel, I should propose a flood channel *there*, straight across; an enlargement of the river *there*, another flood channel *there*, an enlargement of the stream *there*, and another flood channel *there*, deepening the river *here*, so as to give it greater capacity.

1984. Where is that?—That is at Hampton Court.

1985. You propose to enlarge it at Hampton Court?—Yes, and then deepening it very considerably *there* until you get to Teddington. The river is fairly wide *here*, but it would have to be deepened more, and then make a side-cut at Teddington Lock. Weybridge is the principal point where the works are. Then below Weybridge, at Walton, there is another flood channel.

1986. Perhaps you would mention the names of the places you refer to?—There should be another flood channel and an enlargement of the stream leading to Sunbury, a side-cut at Sunbury Lock, dredging the river below Sunbury, enlarging the river at Hampton Court, and deepening the river below Hampton Court and below Kingston, and a side-cutting at Teddington Lock.

*Sir Charles Russell.*

1987. To clear Teddington Lock?—No; to allow of a larger discharge of water there.

1988. I mean clear of Teddington Lock?—Yes, at the side of it. My estimate for that is about 63,000*l*. In order to raise the money required for the project and pay it off, it would involve a rate of 5 *d*. in the pound.

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1989. Over what district?—That would be over each parish which abuts upon the river; of course the area might be subject to some reduction, on account of parts not being benefited. If so, of course it would make the rate for the remainder much higher.

1990. Your works begin at the upper part of the river, at what place?—At Staines.

1991. And from Staines where would they extend to?—To Teddington.

1992. We have had evidence from Kingston, that supposing works were carried out to bring the flood-water more rapidly down, Kingston will certainly be flooded?—Yes; but that will be obviated by what I propose at Teddington.

1993. You have no doubt upon that point?—None whatever.

1994. As regards rating these parishes, some of the parishes might be very much benefited, and others little, if at all?—That is so.

1995. Do you not think that some better system might be devised; some such principle as that adopted by the Drainage Commissioners in the upper part of the river?—That would be, I think, the same in principle. There are two or three of the parishes which would benefit but little by a project of that kind. Weybridge, for instance, is one; Walton is another; Thorp, near Staines, is another where the ground is generally high, and the people living upon that high ground might think it a great hardship to have to contribute towards the expense of removing floods. But I have taken the whole rateable value as a sort of criterion of what rate would be required.

1996. As a rough estimate to be adjusted afterwards?—Yes.

1997. Would the cost of extending the tumbling bays be great in the upper part of the river?—Yes; generally it would be.

1998. Have you made any estimate upon that point?—No, I have not. It would frequently involve the purchase of land.

1999. But supposing a general system were carried out, of extending the tumbling bays, of straightening the river, and of extensive drainage works, the floods in the Thames would be very materially mitigated, you think?—It would be so; we have already proved it in the case of Clifton Weir and Old Windsor Weir.

2000. To go up the river once more, do you think Sandford Lock an impediment?—Sandford Weir, I do.

2001. Would it be possible to remove Sandford Weir?—No, not without destroying the mill power there. But in the project Mr. Beardmore and I designed, we provided for that, so as to pass off all the flood-water at that place by an enlargement of the opening, and by deepening the channel below.

2002. Which would have met the objections which have been raised to Sandford Weir?—Quite so.

2003. Now we have had several suggestions as to what authority should have jurisdiction over the river, whether one Board over the whole river, or whether two or three, or whether one Board with subservient committees, or local Boards; upon that point will you give the Committee your views?—My opinion is that one Board is amply sufficient for it; it is very different now to what it used to be some years ago, when it was difficult to get from one point to another; but there is not a single point on the river

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river that cannot be reached in a very few hours from London.

2004. Then do you consider that one Board could easily take in hand the whole jurisdiction of the river from Yantlett Creek up to its source?—Yes, I have no doubt of it.

2005. Would you advise that the tributaries of the stream up to a certain point should also be included?—No, I think it is quite sufficient to have the main artery under the control of one body, because it is perfectly easy for those who are interested in the tributaries, to make use of the main artery for drainage purposes. An illustration of that occurs at Oxford; I think evidence was given before the Committee the other day of the difficulty arising there from the outlet of the Cherwell; that it was blocked up to a great extent; now if the Isis itself were deepened there, as we contemplate deepening it, there would be very little difficulty indeed in improving the outlets of the Cherwell so as to take off the floods there.

2006. You have jurisdiction over the tributaries to a certain extent now?—No, only to prevent pollution; we have no other jurisdiction.

2007. And that only for five miles?—For five miles.

2008. Do you consider that a better feeling is probable between the Drainage Commissioners and the Thames Conservancy, that they should act more in harmony with each other than they do at present?—I do not think there is any inharmonious feeling between them. I was astonished to hear it, for it was only about two years ago that Dr. Adams, one of the leading men of that Commission, the Bursar of St. John's College, requested that he might have an opportunity of inspecting the plans and sections which the Conservators had of that part of the river. There was an appointment made for him to come to the office, and every plan and every section which we had was brought out before him, and we undertook to give him any information which we had. I had not the remotest idea that there was any unfriendly feeling. Then came that letter, of which probably you will have evidence from the deputy chairman far better than I can give it, and then, subsequently to that, another application from the Drainage Commissioners, saying that they were contemplating the employment of Sir John Hawkshaw, and asking the Conservators whether they would allow him access to such plans and sections as they had. Now I have the custody of all those plans and sections, and I received orders from the Conservators to place them entirely at Sir John Hawkshaw's inspection, or to allow him to make any use that he chose of them. I was perfectly amazed to hear the evidence which was given here of an unfriendly feeling existing.

2009. Did you feel that the Thames Conservancy could easily undertake that work which has hitherto devolved upon the Drainage Commissioners, in addition to their general jurisdiction?—They could do it, but I think that, as that Act is passed, there is no reason at all why the Drainage Commissioners should not carry it out. In the year 1870 the Conservators proposed to take upon themselves the drainage of that part of the river, but it was simply because it was, and is still, in such a horrible state that it is a scandal that it should continue so.

*Chairman—continued.*

2010. Then the Thames Conservancy are not over desirous of taking in hand that part of the river?—Not as a drainage power.

2011. Simply for the purpose of navigation?—Yes, that is as far as I am acquainted with their feeling.

2012. But is it not desirable, with the view to carrying out general works for the prevention of floods, that one jurisdiction should have control over the whole river?—No, I think not; the power of the Conservators is so qualified by that Act, that they could really offer no unreasonable opposition to a plan. It is very important that they should have some control over that part of the river, because it is important, as a kind of reservoir for the water which supplies London. The water there is perfectly pure, and it is necessary that the Conservators should have the control over and the dealing with it. It might be the case that the Drainage Commissioners may propose to carry a straight drain from one end of the district to the other. That would have the effect of draining all those portions of the river which now act as reservoirs, and of course would affect the supply of water to London. It is quite necessary that the Conservators should have some control in that respect.

2013. We have had evidence before this Committee that the Drainage Commissioners and the Thames Conservancy do not act in strict harmony. In case of a conflict of authority we feel that difficulties might arise?—First of all, no conflict has arisen hitherto; with the exception of the refusal of a single return, every communication between the Conservators and Drainage Commissioners, as far as I know, has been of the most friendly character possible.

2014. In the event of your carrying out these proposed works of which you have shown us a plan, at an outlay of 60,000 £, you would propose to rate the parishes abutting on the river?—Yes, that is the only way that I know of getting the money.

2015. Do you think it would be right, under those circumstances, that those persons should be represented in a measure on the Board?—I do not think there is any occasion for it.

2016. You do not think that rating and representation should go together?—Well, it is a generally admitted principle, but I do not think the works are of sufficient magnitude to render anything of that kind particularly necessary.

2017. As regards local authorities and landowners on the upper part of the river, do you think it would be right and proper that they also should be represented on the Board?—They are represented at present on the Board.

2018. There are four?—Yes.

2019. Do you think that they should have more representation?—I should rather leave that to some of the Conservators to answer.

2020. Then, on the whole, I gather from your evidence that you would like the jurisdiction of the Thames Conservancy to continue as it is?—Certainly.

2021. Without being extended?—Yes.

2022. But with powers given to raise funds sufficient to carry out the repairing of the weirs, the increasing of tumbling bays and straightening the river in certain parts, certain parishes being rated for the purpose; and, under those circumstances, you feel that the floods might be very materially mitigated?—Yes, that is my opinion.

2023. I wish

Mr. Walter.

2023. I wish to ask you a few questions about the part of your evidence referring to the possibility or otherwise of anticipating floods. I presume that in dealing with floods, the chief thing is to keep the outfall open?—Yes.

2024. It is something like keeping the door of a theatre open when there is a cry of "fire" inside?—Yes.

2025. Teddington Lock is practically, for flood purposes, the outfall of the Thames, is it not?—Yes, it is.

2026. The point to which the tide comes up?—Yes.

2027. What is the fall at high and low water respectively between the bottom of Teddington Weir and the top?—Do you mean that which is due to the tide?

2028. Yes. At low water, of course, the fall would be considerably higher, I presume, than at high water?—Yes, at high spring tides it would flow through the weir.

2029. What would it be at low water?—I should think when a high flood is prevailing in the river it would not be more perhaps than 18 inches. It would be nearly level.

2030. I mean between the level of the river as dammed up at Teddington Weir and the level at low water?—The fact is, that it is not dammed up at such times; all the artificial impediments are removed.

2031. If you could so far anticipate floods, by looking to the state of the weather, and so forth, as to know pretty well that within a week you might be sure of a flood, would you not by removing every possible obstacle at Teddington Weir, and letting off the water, and so with the weirs above, from lock to lock, considerably diminish the flood?—No, I do not think so.

2032. Will you explain to the Committee why that would not be the result?—Because if a flood is coming down a river, only a few hours are required to fill it up to the high-water mark. When the river is filled up to the high-water mark, it is the duty of those who had charge of the weirs to remove everything in the weirs. Of course it depends upon the quantity that is coming down. I should not say that their instructions are to remove the whole of the weir, when only a small flood is coming down, but that is regulated by a mark. If the water rises up to that mark they have to take out all those things.

2033. But suppose they took them out when the water had not risen to that mark?—Then I say, when a flood is coming down it would only make a difference of a very few hours.

2034. A difference of a tide or two?—I am speaking of where there is no tide. It would only make a difference of two or three hours.

2035. Has the establishment of locks and weirs, in your opinion, rendered the control of the floods more difficult, or less difficult, than it was before, or left matters pretty much as they were?—More difficult.

2036. That is to say it has raised the level of the river?—Yes.

2037. And thereby created a tendency to overflow?—Yes.

2038. Therefore everything depends, does it not, upon keeping the outfall open?—Yes.

2039. And opening the gates as soon as the crowd begins to push?—Yes.

2040. Is it not a fair analogy, to say that the

Mr. Walter—continued.

mode of dealing with the flood, is pretty much the same as the way in which a skilful policeman would deal with a crowd at a theatre, or a skilful commander with an army of 100,000 men in Hyde Park; you must keep the gates open and control the passage of the bodies of men so as to let them out as quickly as possible?—Yes, and I think that is what is done.

2041. Do you think it is done to the utmost extent practicable?—Yes, with this reservation, that if the tumbling bays can be established, they take off the water at once, without any manual labour and without anybody looking after them.

2042. That depends, does it not, upon whether the sill of the tumbling bay over which the water falls, is at its proper height?—Quite so.

2043. Suppose the sills are too high, or cannot be lowered, then the tumbling bays would be of very little use?—Their efficiency would be affected no doubt, but, of course, in putting them in, we should take care they were put at a proper level.

Sir Charles Russell.

2044. I cannot help observing, because I speak practically, and perhaps you will not think it impertinent of me, speaking to an engineer, to say, that I live on a river peculiarly liable to floods; that I have lock-gates extending completely across that river; that I have it in my power to flood about three miles above me, by shutting those gates; or, by drawing up those gates, I can prevent those meadows being flooded. I will not say in all cases; for instance, this winter I could not have done it, but in most. I have also a mill three miles below me, which has been happily burnt down. Since that mill has been burnt down, and there has been no object in shutting back water upon my land, land of mine that could not be drained at all, is now perfectly drained, and there is only an interval of three miles above, and three miles below; but I find the difference to be this: if you pull up the gates, when a resident living there says, "Now we shall have a flood," which is perhaps three days before the flood comes down upon you, I find from practical experience that we diminish the height of the weir, and the duration of the flood, and we are only beaten from preventing the flood, in my opinion, by persons below us shutting back their water, and not giving it free access in time, and to a sufficient extent, so that, at last, we get to a level, beyond which we cannot relieve ourselves. With all the impediments in the Thames, do you not think it is worth while to supplement the improvements you suggest with timely removal of these obstacles. What harm can it do to telegraph from the upper district "Heavy rains; imminent flood;" and supposing that, upon receiving such a telegram as that, the lock-keepers down the river proceeded to let the water go considerably below high-water mark, as they know that they are presently going to supplement it with a flood; is there any harm in that?—The particular harm is this, that it stops the navigation, and it stops the mill. My plan of tumbling-bays stops neither.

2045. To criticise your tumbling-bay scheme, I also know about tumbling-bays, but they are only at a certain level?—That is so.

2046. My object is to reduce the level of the river to its lowest point, when you know there is a flood coming; therefore I confess that you may injure

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Sir Charles Russell—continued.

injure the millowner for a few hours, although you benefit him in the long run, because, instead of giving him a head, when his tail-water is level with his head-water, you still allow him sufficient water to work his wheel; is not that so?—I can only say what I have said before, that on the Thames I am satisfied it would only pass the floods for a very few hours.

2047. Have you tested whether the mills have raised their mill-heads and their sills, with a view of getting a greater head of water, since they were originally instituted?—I believe it is the case that they have been raised, but I am quite certain it has not been the case since the Conservators have had the jurisdiction.

2048. Am I right in saying that there was originally a stone which marked the level of head-water which a miller was entitled to?—Either a stone or a cast-iron mark.

2049. Has it been tested to see whether either the mark has been altered, or the miller has, disregarding the mark, raised his sill, and his head, so as to get a greater control of the water?—I have never had a suspicion that it has been done in any part of the river under the control of the Conservators. I have a record of every one of these marks, and I might at any time test it. I have done so, not systematically, but occasionally.

2050. And without finding that they have taken advantage?—Certainly. I believe, from what I saw, that in former years it has been done. I have not the slightest doubt that at Sandford, which has been mentioned, a bank was raised up by a former miller, to the great detriment of the river.

2051. Do you think it would be fair of the Legislature to say, "You have taken advantage of inadvertence, on your not being noticed, and you have dammed up the river, to the injury of many persons; and therefore you have no right to complain, if we take means to make a remedy, and to relieve the river to the extent that you have dammed it up?"—That would imply that you have the evidence that such a thing has been done.

2052. You do not think it could be obtained?—I should doubt it very much.

2053. Are the flood-gates and tumbling-bays, at such mills as you have inspected on the Thames, sufficient for their purpose, in your opinion?—No, they are not; hardly in any case.

2054. Do you think it would be a hardship to call upon the millers and millowners to put their gates and tumbling-bays into such a condition as not to be a public nuisance?—I am afraid you would not get much out of the millers in that way.

2055. But you do not think it would be a hardship?—The difficulty would be to prove that they had encroached upon the waterway; if you could prove that they had encroached upon it, I imagine there would be no difficulty about it, but I do not know of any weir on the river where that can be proved.

2056. But still it can be easily proved that there is not sufficient waterway at the mills?—Oh, yes.

2057. If Oxford carried out your scheme, would it have the effect of pulling down much more water more rapidly upon the river below?—No, I do not think it would, because it would be the same quantity of water

Sir Charles Russell—continued.

as comes now, but it would come gradually. It is not as if it involved any sudden drawing-up of the tackle, or anything of that sort; it is designed so that the floods should relieve themselves as they rise, therefore I do not think it would have any such effect as that.

2058. Are the mills there absolutely under their own control, that in a flood, when you should think it necessary to have all the paddles up in your weirs, they could keep their gates shut if they pleased?—No, certainly not; and that was one of the objects which the Conservators had in view, when they consented to purchase these weirs, and pay the compensation for them, which has cost them some 6,000 l. or 7,000 l., so that they might have a control over the weirs, without any question, instead of the millers.

2059. You do not understand my question: my question was, is it at present the fact that the millers are without control; that is to say, that they can shut their flood-gates when they please, and open them when they please?—No, they cannot; this Goring Weir, for instance, is entirely worked by our own people; the millers have nothing to do with it.

2060. Supposing they take up the whole of these paddles, and the miller chooses to keep his flood-gates shut, is not he depriving the river of that means of relieving itself which his three flood-gates being shut make the difference of?—You refer to the flood-gates at the mills?

2061. Yes?—Those are under his own control.

2062. He can, if he pleases, keep those gates shut, at a time when you would think it expedient that everything should be opened which could possibly be opened to let the water go?—Yes; but it would not be to his interest to do so, as long as he could work his mill.

2063. That is perfectly true; but when he finds that he cannot work his mill, then, sometimes, does he not keep his gates shut?—Not within my knowledge, but it may be so.

2064. I have seen it myself, and that is why I press the question. You said just now, with regard to the tributaries, that you did not think it was necessary that the Conservators should have any control over them, taking the fact that the Colne, and the Lodon, and many other rivers pour down, very suddenly, enormous volumes of water into the Thames, and that the millers do with regard to these exactly what they do on the Thames with no one to interfere with them; they shut the water back, and let it go, just as it suits their whim and fancy; do you not think it would be desirable that there should be some authority controlling them, with a view to mitigating the floods as much as possible?—I think it would be reasonable they should be under just the same control as they are on the Thames.

2065. Which, unfortunately, is nothing now?—On the tributaries, I suppose not.

Sir Trevor Lawrence.

2066. We have had it in evidence that in the flood last winter at Kingston something occurred at Teddington, and the evidence of the witness was that the flood fell suddenly two feet; what was it exactly that happened at Teddington?—A small portion of a bank gave way.

2067. Of the river-bank?—Yes, of the bank which is above the lock.

2068. And what was the result of its giving way?

Sir Trevor Lawrence—continued.

way?—It was said to have diminished the height of the water at Kingston some inches.

2069. I do not mean at Kingston, but the immediate result at the place where the bank gave way?—I do not think there was any result at all, because the river was rising at the time, and continued to rise.

2070. The statement that we had was that the bank gave way, and that the water then spread itself over the neighbouring country, not that it ran away by the natural river-channel, but that it spread itself over the country; was that so?—No, it was simply impossible that it should be; the opening through the bank was so very limited at first, that such a result as that would be simply out of the question; it could not happen. I think it was, in all probability, owing to the water rising considerably in the river generally, on account of the rain at that time, and it was attributed, by those who perhaps did not take pains to satisfy themselves upon all the circumstances of the case, to the bursting of a bank which could not by any possibility have produced that effect.

2071. Then if it were really the case that the water decreased to the extent of two feet in height at Kingston, it being also the case, as I understand, that the river was then rising, what would be the explanation of that?—I deny altogether that it could have fallen to that extent, or to an appreciable extent. The opening at first was small, though it gradually got deeper and deeper, and ultimately became a large opening; but at the time which has been mentioned as the time when that wonderful diminution in the height of the water occurred, it was really a very small opening; it was not more than the length of this room, perhaps, by three feet in depth.

2072. When this opening grew up to a large one, where did the water go?—Into the river below.

2073. It did not spread over the country?—Oh, no.

2074. With regard to the scheme which you showed us for making an alteration in dredging from Penton Hook downwards, have you made any calculation as to what height that would reduce the general level of the water?—Yes; I think in a high flood, not an extremely high flood, it would reduce the level at Staines from 12 to 15 inches. In a moderate flood it would have a great deal more effect.

2075. Would it be a reduction sufficiently great to affect such a flood as we have had this year materially?—I think it would be, in this way, that it would prevent the flood rising to its height so rapidly as it did, and it would also take it off more quickly. It would not only affect the extreme height of the flood, but it would reduce it, both in its rising and falling.

2076. We have had evidence from some witnesses that, in addition to the flooding effect which is produced by the water overflowing its banks, considerable flooding effect takes place from percolation, and the water rising. Port Meadow was particularly referred to, as being flooded mainly by water which percolates through the soil, and rises; would this scheme of yours reduce the level of the river, generally, sufficiently to affect this percolating process?—Decidedly.

2077. I suppose that process could only go on where the river is to some extent confined within high banks immediately approximate to the river

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Sir Trevor Lawrence—continued.

and this lower ground beyond?—The effect would be to lower the bed and surface of the river altogether, to make it altogether at a lower level; therefore, there would be the less probability of the water rising by percolation.

3078. With regard to the powers which the Thames Conservators now have over the tributaries, to an extent of five miles, is that a sufficiently extensive power to be of any value in controlling the pollution of the tributary streams?—I think so: for instance, on the Wickham stream, where there are a great number of mills, we have given a number of notices, and that certainly has been attended with very great efforts on the part of the millers to do away with the pollution. They are paper-mills principally.

2079. If you have got, for instance, such a town as Guildford, which is on the Wey, that is a large town; and not only all the pollutions of the mills go into the river, but the whole of the sewage of the town also goes in?—That may be so.

2080. Presumably, it is so?—Yes.

2081. If the stream is to be kept in a reasonably pure state, ought not the powers of keeping the sewage and mill pollutions out of the river to extend farther than five miles?—Well, it would be laying a very great burden upon some one or other.

2082. It seems to me rather a curious provision that a town which is  $5\frac{1}{2}$  miles from the River Thames should be able to do what it likes with the tributary upon which it is situated, whereas a town  $4\frac{1}{2}$  miles can do nothing?—Yes; that is the case, no doubt.

Mr. Praed.

2083. In your evidence on the upper part of the Thames, you said you had recommended dredging to the extent of about 29,000*l.*, and only about 4,000*l.* had been spent; whereas from Staines, lower down, you had done dredging to the extent of about 10,000*l.*; that arose, I suppose, from your want of funds?—It did.

2084. Supposing the Upper and Lower Thames Conservancy were amalgamated together, and the funds devoted to the lower part were used partially in developing the upper part, there would be ample means to do so, I suppose?—Yes; but that is rather a complicated question. Upon the face of it, it would be a very desirable arrangement. At present the funds are separate by Act of Parliament. The Conservators have made the Lower funds to assist the Upper, as far as they legitimately could. For instance, my own remuneration comes from the Lower fund, and all my services are given, so far as they are required, to the upper navigation, without any charge whatever for them, and it is so also in regard to others in our establishment.

2085. In fact, nearly the whole work of the upper part of the Thames is carried out by funds from the lower part?—Yes.

2086. As regards the staff?—Quite so.

2087. As regards the navigation on the Thames upwards, what is the amount of barges which travel over the river in the course of the year?—The whole revenue derived from that, between Staines and the farthest limit of the jurisdiction, is about 3,000 *l.* a year.

2088. Does that include pleasure boats and steamers, or simply barges?—The evidence will all be put in, so that you will have it in print; it

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is about 4,000 *l.* a year, and that includes the pleasure boat tolls.

Mr. Samuelson.

2089. Were you the Engineer of the Thames Conservancy, when they introduced their Bill into Parliament in 1869?—Yes, I was.

2090. Did you hear the evidence, in which it was stated that your plans were so expensive, that the tax which would have to be borne by the landowners would have been intolerable; and that the plans would have also been quite inefficient for the purpose of drainage?—You refer to those plans for dealing with the river at Oxford?

2091. It was chiefly at Newnham, I think, but generally the plan of 1869; and that, in consequence of that having been proved, your plans were rejected, and the Drainage Board was formed?—No, I never heard that, I have never yet heard a tangible objection to that scheme for lowering the level of the stream at Oxford.

2092. But if that evidence has been given in this room, are you prepared to rebut it, or to state what the circumstances really were?—I have no knowledge of its having been given. I should most certainly adhere to that plan, and contend that it was the best plan that could be devised.

2093. Can you tell us what was the amount that you proposed to raise?—I think it was about 30,000 *l.*

2094. The amount stated to us was, I think, considerably in excess of that?—I have no knowledge of that; I know what we designed was that 30,000 *l.* was proposed to be raised from the local authorities, and about 11,000 *l.* from the Conservancy, as being due to navigation works.

Mr. Cartwright.

2095. £ 41,000?—It was about that.

Mr. Samuelson.

2096. Do you remember what would have been the rate upon the land affected?—We never contemplated raising all the money upon the land; it was considered to be so great an advantage to the University of Oxford, and possibly to the city of Oxford as well, that the money ought to have been raised by a tax upon them.

2097. Did it transpire upon what ground that plan was rejected by the Committee?—I do not think it ever came before the Committee, I do not remember that it did.

2098. How was it that that Bill did not pass?—The Conservators withdrew the clauses which had been inserted in the Bill, authorising them to tax the landed proprietors. I do not think any particular sum was mentioned in the Bill.

2099. That it was mere fear on the part of those affected?—I think that perhaps you are mixing up two separate things. In 1868 Mr. Beardmore and myself prepared that plan, the report upon which I have put in; that was simply for dealing with the floods at and around Oxford. In 1870, when the Conservators went to Parliament, they introduced clauses into the Bill, authorising them to carry out drainage works there, and in the district beyond Oxford, and to tax the landowners.

2100. Then you now refer to works which were proposed in 1870?—No; these that I have

Mr. Samuelson—continued.

given evidence upon, as being suited to lower the water at Oxford, were in 1868.

2101. But the drainage works were in 1870; do you remember what was the amount of those?—I do not think there was any evidence given of that; I do not think it ever came before the Committee; the clauses were withdrawn.

2102. In consequence of opposition from Oxford and the neighbourhood?—Yes.

2103. You stated that it was conceivable that the Drainage Commissioners might carry a straight drain throughout their district, and that that would affect the water supply of London?—Yes.

2104. In what way would a straight drain affect the water supply of London?—Because it would lower the level of the water very much. It is an extreme case perhaps.

2105. You put it as an extreme case, by way of illustration?—Yes.

2106. The volume of water would remain the same?—Yes; but instead of being stored in a circuitous course, as it is now, it would come down too rapidly.

2107. At certain times, of course?—Yes, of course; but in that part of the river beyond Oxford, there are reaches as fine as any below Oxford; they are capacious, and hold a great deal of water.

2108. You have stated that if a system of telegraphic communication were established, enabling you to send orders to remove all obstacles, when a flood was anticipated, the floods would not be reduced, but they would only be shortened a few hours in their duration?—Yes, that is what I stated.

2109. Do you state that as a matter of opinion, simply, or have you entered into precise calculations, in order to ascertain that that would be so?—I state it is a matter of opinion, based upon a good deal of experience.

2110. How has that experience been acquired, on the Thames?—Yes.

2111. Then has the experiment ever been tried?—Not with the view of passing floods; but when it has happened sometimes that we have had to draw water in a reach, when the necessity for that has ceased, and we have put the tackle in order again, it is a matter of a very few hours to recover the head of the water.

Mr. Walter.

2112. Will you state what is the margin of water over which you have control in a reach, say between Teddington and the next lock above. Up to what height can you raise the water by opening or shutting the gates?—In summer time, when the volume of water is limited, it would be six feet at Teddington off to nothing at the further end of the reach, five miles off.

Mr. Samuelson.

2113. And from that you conclude that the opening of these impediments along the whole course of the river, would have but little influence upon the flood?—Very little.

2114. The Thames Conservancy became the possessors of the weirs in connection with the various mills?—They did.

2115. And you executed works upon them which you thought would enable you to avoid the injury from floods which had previously arisen?—As far as we could.

2116. In

Mr. Samuelson—continued.

2116. In executing those works, did you take into account that which the millers could do or leave undone?—No, simply those works over which we had control, leaving the millers to themselves.

2117. But in your estimate of the works required, did you or did you not take into account that the millers would do their duty?—Well, their duties would be very limited; they would be only to the extent of shutting down the gates in front of their wheels. I do not see how they could meddle with the weirs in any other way than that.

2118. But you anticipated that they would do what was reasonable, with respect to their gates?—Oh, yes.

2119. But if they should fail to do so, that would make a considerable difference?—Not a considerable difference.

2120. So that you do not attach much importance to that?—No, I do not.

2121. Even if they neglect to do what might be reasonably anticipated that they would do, you do not think it would make much difference with regard to the floods?—No, I do not.

2122. You stated the amount of rate which would be required in order to carry out certain works which you described; and you stated also that certain parishes might reasonably object to be rated?—Yes.

2123. Did you calculate what increased rate would be required if those objections were sustained?—No, I did not; I meant it rather as an illustration of what would be about the amount which would be required; I stated that a 5 *d.* rate would be required to cover that expenditure. Of course, if any parishes could establish their immunity from that rate, it would be so much higher for the others.

2124. And how much higher, do you think, it would make the rest?—I should not think it would make above a 1 *d.* difference.

2125. But if only those were rated who would be actually benefited, the additional rate would not be above 1 *d.* in excess of the rate you first mentioned?—Yes.

Mr. Cartwright.

2126. I did not hear the whole of your evidence, but I think I heard you say that you thought it was not necessary for the conservators to have any jurisdiction over the tributaries of the Thames?—Any jurisdiction beyond what they have now.

2127. You have investigated those, and you know them well?—Yes.

2128. Do you know the Cherwell?—Yes.

2129. Do you think the jurisdiction which the Conservators at present have is sufficient to control any flood coming down from the Cherwell into the Thames?—No, I do not say that, but I think if such a scheme as that which Mr. Beardmore and I designed were carried out at Oxford, it would give an opportunity for the Cherwell floods being carried down more freely.

2130. I heard you say something with reference to that, and I should like to know whether you consider that the scheme, as you propose it, is one which would deal sufficiently with the present state of the floods?—No, it would only have given a much larger capacity to receive the Cherwell floods.

2131. Do you think it would be sufficient to  
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Mr. Cartwright—continued.

cope with your present difficulties with regard to the floods in the Cherwell?—Yes, I think so. It would mitigate them very much indeed.

Mr. Samuelson.

2132. What, in ordinary times, is the relative volume of water in the Isis and the Cherwell at the junction with the Isis?—I could not say; I have never taken any observations upon that.

2133. But is not that a very essential part of the question?—No, I do not think it is. Of course we have the discharge into the river now, and we know what the effect of that is. I say if we give the river much greater capacity, as I propose to give, it would by so much enable the Cherwell floods to be carried off.

2134. To what extent would your works have increased the capacity of the Thames at that point?—I should think 50 per cent.

Mr. W. H. Gladstone.

2135. Am I right in thinking that you look to dredging and deepening the bed of the river as the principal remedy for getting rid of the floods?—Yes.

2136. Do you use steam for dredging?—Yes, we do.

2137. But you have not been able to carry it out to any extent?—Not in the district beyond Staines.

2138. In the upper part of the river, should you say that the state of the river as to dredging is improving from year to year?—Yes.

2139. With regard to bridges, have the Conservators any control whatever over the construction of new bridges?—Oh, yes, they have.

2140. Do you think any very great increase of income would be necessary for you, in order to keep pace with the work that is required to be done?—I should think 4,000 *l.*, or from that to 5,000 *l.* a year.

2141. Beyond what you receive now?—Yes.

2142. Upon what principle was the sum which you receive from the waterworks companies fixed?—I do not think it was any particular principle; it was what we could get from them.

2143. The water supplied now is, I suppose, very much better in quality than it was at the time that sum was fixed?—Yes, there is no doubt of it; there have been a great number of drains, which formerly discharged into the river, stopped.

2144. Would it be unfair, in your opinion, to ask the water companies for a larger contribution?—I do not think it would be very unfair; water is their stock-in-trade, and for each of them to pay 1,000 *l.* for their whole stock-in-trade is, I think, a very moderate sum.

Chairman.

2145. From your experience, do you know of any case where the marks have been removed from the weirs?—No, none.

2146. You have stated, in answer to an honourable Member, that in 1870 you applied for certain powers, and that you withdrew your application in consequence of certain clauses being introduced; what was the nature of the opposition which induced you to withdraw?—It was the opposition of the landowners; they objected to be rated by a body sitting in London.

2147. In order to carry out these works, which you consider necessary, and estimate at 30,000 *l.* for the works about Oxford, and 63,000 *l.* for the  
works

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works below Staines, will it be necessary for you to make application to Parliament?—Yes.

2148. And in that application, I presume, you will ask for rating powers?—Yes.

2149. I presume that it is the interest of mill-owners in all cases of floods to open their flood-gates for their own purposes?—Yes; the sooner they get rid of the flood the better for them.

2150. And it is very rarely, if ever, that they keep their flood-gates closed, except through carelessness, in the case of floods?—I do not think they ever do; I have never had a case brought under my notice.

2151. Your plan for Oxford was prepared in 1868, I think?—Yes, it was.

2152. And when was the plan which you submitted to us just now, of the works below Staines, prepared?—In the present year.

2153. Since this inquiry?—No, before.

2154. But I presume, in consequence of the severe floods?—Yes.

2155. Have you the plans connected with this report of yours for works at Oxford?—Yes.

2156. Have you a copy which you can deposit with the Committee?—Yes.

2157. And also of the works at Staines?—I have not a copy of that.

2158. But can you supply us with a copy?—Oh, yes, certainly.

Sir Charles Russell.

2159. Would the dredging be an annually recurring expense, or do you think that if you, so to speak, broke the neck of it, by a large expenditure over eight or ten years, that you would still have the annual expenditure of dredging and keeping the river in a proper state, or would it be from the silting up, an annual expense?—There would be certain localities where it would silt up, but, as a general measure, I do not think it would, and I give that opinion as the result of a good deal of experience.

2160. You think it would be a diminishing expense?—I think so.

2161. Have you ever your attention called to this fact, that the floods go down more on a Sunday than any other day?—No, I have not.

2162. I should be very much obliged to you if you would make some inquiries from those who observe those things to find out whether it is not a saying of those who live in flooded countries, "Now Sunday is coming we shall have the floods down," and simply because the millers are not working their mills?—I should think that it would have the opposite effect.

Mr. Samuelson.

2163. Your estimate of the rate of 5 *d.* applied to works to be executed on the lower river?—Yes.

2164. What is your estimate of the rate required to carry out the works in the neighbourhood of Oxford?—There is an uncertainty as to what should be taxed for it. This plan was prepared simply to deal with the floods at Oxford, leaving it of course to those who were interested in it to consider how the money might be raised.

2165. But you do not now propose to execute those works?—No; nor did we at any time propose to execute them, except with the concurrence and assistance of the Oxford University and the Oxford City.

Mr. Samuelson—continued.

2166. Are there any works at all projected now by the Conservators for that portion of the Thames, for any purpose whatever?—Oh, yes, we are still going on with works there.

2167. But no works for which you would require to borrow money?—We are obliged to borrow the money.

2168. Upon the security of the rating powers which you possess now?—Yes.

2169. You do not propose to take any fresh rating powers with respect to the upper portion of the river?—We have no project of that kind.

Mr. Cartwright.

2170. The works which you are alluding to are simply the sort of operations which have been going on for a number of years?—Yes, for the last 10 years.

2171. Those operations are not of any magnitude, are they?—No, but we have spent some 60,000 *l.* or 70,000 *l.*

2172. You have not been contemplating any scheme for the improvement of the upper river since 1870; I mean above Oxford?—No, I cannot say that we have.

2173. The whole thing has been in abeyance since then?—To a great extent it has, but at the same time we have done works of some importance there.

2174. But there has been no scheme, no project on the part of the Conservators, since then, for any improvement of the upper river?—No general scheme in detail; but there has been a great deal done.

Mr. Samuelson.

2175. Affecting the drainage as well as the navigation?—Not much affecting the drainage, except the removal of the weirs, at which the whole river was expected to pass through an opening from 30 to 34 feet in width.

Mr. Cartwright.

2176. Then the real activity of the Conservators has been directed to the lower part of the river?—Yes, there is no question about that.

Mr. Walter.

2177. Can you state at all what is the height to which the lock system has raised the river above what would have been its ordinary level, from reach to reach; supposing there were no locks at all, what would be the height of the river in its normal condition?—I could hardly give an answer to that.

2178. You cannot state what the system of locks has been in raising the levels, except that it has raised them?—Yes, it has raised the level to some extent.

Chairman.

2179. In the summer it would be almost dry in parts without any locks, I suppose?—There is no question about that.

Sir Charles Russell.

2180. Do you happen to remember what height Cricklade is above the level of the sea?—I do not remember Cricklade, but we have got Lechlade.

2181. That is quite near enough for my purpose?—At Lechlade, it is 224 feet above Trinity high-water mark.

2182. When

Mr. W. H. Gladstone.

2182. When the water is at high-water mark, is the minimum depth?—I do not quite understand the question.

2183. You have a high-water mark?—Yes.

2184. When the water is up to that mark,

Mr. W. H. Gladstone—continued.

what is the least depth of water?—In many cases there is only a difference of 10 inches between the low-water and the high-water mark.

Mr. Leach.  
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Mr. ROBERT RAWLINSON, C.B., called in; and Examined.

Chairman.

2185. You have had considerable experience in engineering works?—Yes.

2186. At present I believe you are engaged by the Local Government Board?—I am the chief inspector to the Local Government Board. I have been under Government since 1848. I was one of the first inspectors under the Public Health Act; previously I was engineer for the Bridgewater Trust.

2187. Have you given up the Bridgewater Trust?—Yes.

2188. Then is your sole occupation now the inspectorship for the Local Government Board?—It is.

2189. You have been present during the evidence that Mr. Leach has given the Committee?—Yes, a portion of the time. I may say, I was Chairman of the Rivers Pollution Commission, which has reported upon the Thames, which was a Royal Commission.

2190. When was that?—I hold the Report in my hand. This Report is dated the 29th of March 1866, and the Commission is dated May 1865.

2191. Therefore your attention has been very much directed towards the pollution, among other rivers, of the River Thames?—Especially, and to modern river legislation. For instance, some of the powers of the Thames Conservators are based upon this Report; they spring out of it, and legislation that has taken place with regard to the Thames since this Report, is based upon it.

2192. As regards the floods in the Thames, have you directed your attention also to them, with a view of mitigating them?—That did not come before us as Commissioners, only incidentally in taking our evidence; but as an engineer, I have considered the cause of floods, and I have also considered what would be a remedy. Of course, the cause of floods is one thing, but the effect is contingent upon so many local circumstances that any general reply would be of very little value; for instance, if the question is put, as it was put to me in the House of Lords a short time ago—

2193. May I ask, have you given evidence in the House of Lords on the General Drainage Committee?—I have; and my view with regard to the remedy for floods is this: the remedy I conceive is embanking. There are districts and conditions under which rivers exist where embanking would scarcely be permissible. Take the rivers that flow down through the manufacturing districts of Lancashire and Yorkshire; there you must resort to some other process, because, especially during the last half century, rivers have been so dreadfully abused by the casting in of solids, that their beds have been raised through those districts many feet vertically. That raising of the bed causes flooding of a much more destructive character than in former times. The remedy for that must first be the

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Chairman—continued.

stopping of the throwing in of solids, and then dredging.

2194. As regards the River Thames, the filling up is not of any great extent?—No; the Thames is not exposed to the abuses of the Rivers Aire and Calder, Mersey, and Ribble.

2195. What is your opinion as regards the effect of large tumbling bays for carrying off the flood water?—Of course the more facility that is given for the water going away, the more readily it will go, but the removal of weirs would not necessarily diminish the effects of heavy floods in other parts of the river, seeing that weirs, of whatever class or character, neither add to the volume of water nor diminish it; they simply enable the water to get past a particular spot in a particular way.

2196. Still, I presume, that any obstruction in the river must, more or less, in flood time, keep back the water?—No, I think not; a weir is put up for a special purpose; there is a pond above and a pond below; the pond above is full of water in dry weather, or it will be of no use, and the pond below has also a volume of water in it. Now the effect of the weir is to pond the dry weather flow at an unnatural level in proportion to the height of the weir. The effect of the weir in a flood is by no means as is anticipated. There is a diagram here to show what the effect is. As the water is rising on that weir for every inch that it rises upon the weir it floods the pond at the foot; so that if you have a weir with a dry weather fall of 12 feet, when the flood is 12 inches upon the weir, it is level in the pond below, and if the flood goes on rising the weir is entirely lost in the flood water. It is manifest, therefore, that whether you had the weir there, or you had not got it, you would affect that flood very little; but then remember these are extreme floods. There is as much water in the river, and the land is as much flooded within a mile below the weir or a mile above it as if there were no weir at all. It is interesting to see, but it is difficult for a non-professional person to understand. This is a weir, the water coming down and falling there. Now these lines represent the relative rise of the water in the first of the flood, and the lines below represent its relative rise as the flood is rising, and then the flood rises up to here, and you see the weir is lost entirely; indeed the water has a level top, or rather it is the natural fall of the river, but the weir is entirely submerged and lost to sight.

Sir Charles Russell.

2197. But would not the weir help it to get up to that level; it would have been slower in getting up there if the weir had not been there at all, would it not?—The weir may, no doubt, at this particular point, raise that flood a little, but a mile below it or a mile above it does not affect it at all. None of the conditions of the river

Mr. R.  
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river are altered above or below it; you see how slightly it meddles with it here, because the velocity is quickened as the flood is rising; the proportion is this, for every inch over the weir the pond below rises a foot.

Mr. Cartwright.

2198. Below it rises a foot?—Below the weir into the pond below.

Chairman.

2199. For one inch above it rises a foot below?—Yes, that is taking the average, but that shows the effect of a flood which was watched and gauged, and it is the effect of floods upon all weirs. For instance, upon the Bridgewater, the old river navigation belonged to the Bridgewater Trust, and their flats drawing four feet of water, upon the top of a flood could go over a weir like that, as if it had not existed, all the way from Manchester down to Runcorn, the weirs being lost in the flood.

Mr. Walter.

2200. That only applies to strictly flood seasons?—To the very highest floods.

2201. It does not apply to the normal rise of the river?—No, it is an extreme flood; and that question wants to be properly understood, because the reply seems almost absurd, that a weir does not interfere with floods, or does not cause flooding. In ordinary seasons of course it does to the extent that it obstructs the water, but in an extreme flood, a damaging flood, it is absolutely lost in the flood.

2202. You mean in such a flood that the river would be over the banks above the weir?—Yes, and if you lifted every weir out of the Thames at this moment you would very little affect the lands on either side that are now flooded; you would remove the floods from Windsor, Reading, or Oxford, very little indeed, they would be as liable to be flooded as they are now; you must do something else besides that.

Chairman.

2203. Your remedy is embanking?—Embanking to keep the river within its channel, because the volume of water that is damaging in a flood, that is to say, the three or four feet of water which flows over the land on either side, is a very fractional portion of the volume that is rolling down the river in the flood; and if you could shut the whole of the water within these embankments, the probability is you would not raise the vertical head of the flood more than a few inches. If you can imagine that the land is flooded for a mile or two miles on both sides, that sheet of water is a mere fractional portion of the volume that is rolling down the river; and if you could confine that in by a system of embankments, it would pass away with the flood very slightly raising its head.

2204. Are you acquainted with the River Thames?—Necessarily.

2205. From having considered the subject of pollution?—I have personally examined it.

2206. Is it your opinion that without going to the great expense of embanking, by straightening the river in parts, by considerable dredging, and by extending the tumbling bays, to let off the flood water, that would meet the difficulty as far as mitigating the floods is concerned?—It would mitigate moderate falls of rain, and moderate

Chairman—continued.

floods, but it would have nothing to do with those floods which cause the great consternation and damage which we have every two or three years.

2207. It would have little or no effect upon such a flood as we have had this winter?—No.

2208. Then you would consider that it was needful to erect a bank upon both sides of the river, for a considerable extent?—In the agricultural districts, yes. Where the river floods towns, you must treat it differently. You could not deal with Eton and with Reading, or with any town that is liable to be flooded as with land; you must, however, have embankments; certainly not such as are here on the Thames at London, but you must have a different and much cheaper form of embankment.

2209. And you think that embankments could be made by which the water could be kept within its banks, and that it would not percolate through, and get behind the banks?—No; you have only to do for the Upper Thames what was done at some period; we have no record of its date, that is, the embankment of the Lower Thames of the estuary, and of the Isle of Dogs, of West Ham, and, on the opposite side, the London Gas Works, which have protected themselves; they are never flooded, when all the streets about them were flooded, and the railway station was almost unworkable, and under water, the gas works were free from water.

Mr. Samuelson.

2210. What was the difference of level?—The gas works were the lowest. If the gas works had permitted the floods to flow over them, all the retort fires would have been put out, and they would have been six feet deep in water; the cellars of the houses in the adjoining streets were flooded up to the ceilings.

2211. How was it that the back-water did not reach them?—The works are inclosed by an embankment all round; they are entirely isolated all round.

Chairman.

2212. It is a fact, I believe, that a portion of the marshes in Essex are below high-water mark?—In West Ham a large portion of the inhabited area is 10 feet below high-water mark. A large portion of the Isle of Dogs; a considerable portion on the southern side of the river; and then you have the incident of Holland, where you have a kingdom below high-water line.

Mr. Walker.

2213. Have you made any calculations, at any time, to see what quantity of water is to be carried off in a high flood. Take the case of a flood of ten inches in two months, as we had last winter, how many millions of cubic yards of water would have to be carried off by the Thames?—No accurate calculation can be made of it; it is so large there is no means of getting at it; but I have had occasion to turn my attention to the difference between dry weather flows and flood flows in other rivers, and I have had some means of getting at a tolerably accurate notion as to the difference between the dry weather flow of a river and its flood flow. A river like the Thames is not amenable to the same law as a smaller river which I have had an opportunity of measuring, therefore the figures will

*Mr. Walker*—continued.

will not fit. But in some of the smaller rivers, having a drainage area of 10,000 or 12,000 acres, the difference between the dry weather flow and the wet weather flow is as 1 to 500; that is, 500 times as much water comes down in the flood as you have during six or twelve months of a dry season. Down the Thames, at Teddington Lock, I think, the dry weather flow has been gauged pretty accurately, and it varies from 300,000,000 to 350,000,000 gallons in the 24 hours. Then I consider, from my experience and from the rainfall of the Thames valley, that the average flow from that lock, taking the 365 days, must be 1,000,000,000 gallons; but the excess I cannot tell you; it certainly is not 500 times.

*Chairman.*

2214. Then you are quite of opinion that the only remedy for such floodings as we had this last winter is by embankment?—I am satisfied of it. For instance, Barnes; the land was under water, and, by-the-by, it was put under water by this flood when it had not been for some years; the banks at Barnes, Elms, and the opposite side had been allowed to get out of order, and the only practical remedy is renewed embankments.

2215. How high do you think it would be necessary to go as regards the Thames?—It would entirely depend upon circumstances; in some cases from two to three, or even four feet, and I scarcely think in any case more than four or five feet, but Mr. Leach knows much better than I do. It does not follow at all that it would be expensive.

2216. Mr. Leach has not suggested embankment?—Simultaneously with embanking, there must be arterial drainage, because you cannot leave the land which is embanked from the river water-logged. There must be arterial drains running along with the embankments, to take the upper subsoil and surface water into a lower reach, and there must also be flood-gates, and means of controlling the land and river water, and many of the landowners would not thank you to embank their land.

2217. They say it is improved by the floods?—Yes, they would rather have the floods upon it. I say there is no reason why they should not have the water on the land whenever they like, by means of their own sluices. There would have to be flank embankments to prevent adjoining proprietors being flooded by their warping.

2218. Effectually to prevent flood, how far do you think an embankment would be necessary to be carried?—It would entirely depend upon the survey; I could not at all say, but in some cases instead of allowing the embankment to follow the windings of the river, as you see there, probably it would be carried straight across. Then the loop would be subjected to flooding. It is not necessary to carry the line of the embankment altogether round; it depends upon what character the land is, and what would be its condition. You could embank the River Thames with embankments much shorter than the main channel.

2219. Has your attention been directed to forming storage reservoirs, with a view of impounding flood-water in times of floods, and applying them usefully for the purposes of the water supply in the summer?—If you are to make storage reservoirs, make them, but never for a moment dream that any storage reservoirs

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*Chairman*—continued.

within your means will have anything but an infinitesimal effect upon the floods; make storage reservoirs if you want them, but not to reduce the floods in your river; it would be mere child's play.

2220. They must be of such an enormous size?—In such a river as the Thames.

2221. We are speaking of the River Thames?—If you come to a river or a stream with 2,000 or 3,000 acres, you may make an impression upon it, but not upon such a river as the Thames. Since I came into the room I have made some rough calculations of what impounding reservoirs might do. At present London is supplied with about 120 million gallons of water per day. If the whole of that was taken from the River Thames, it would be one-third of the dry weather flow; it would be one-tenth of the average flow, and about one-fifteenth of the flow above the average, and I have calculated that it might be one-hundredth of a very heavy flow; but 120 million gallons is not taken, it is only about 60 million gallons.

*Mr. Samuelson.*

2222. Then, according to that, the quantity of water coming down in a very heavy flood would be 33 times as great as the dry weather quantity?—Yes, and more.

*Chairman.*

2223. You say that the minimum flow of 120 million gallons per day would be about a third of the total flow?—About a third of the total extreme dry weather flow volume. Now, with regard to the rise of floods, you have not a rise in the River Thames equivalent to what you have in the River Eden, at Carlisle, and the River Ouse, at York; they are of less area, and the water comes down more quickly; in the River Eden, at Carlisle, from summer level to extreme flood level the water rises 23 feet, and it rises about the same at York; it is embanked in both cases; it is embanked from the cities in both instances, and embanked from the land. Now, where you have what may be termed equalising reservoirs, such as you never could hope to have on the Thames; for instance, take the lakes of Cumberland, you have a comparatively small area, and yet those lakes rise from 12 to 14 or 15 feet, vertically, in floods, and the entire volume pouring out at the outlet increases by the head that has risen in the lakes. Now, if these lakes were 10 times the size, they would be filled during the prevalence of these floods.

*Mr. Samuelson.*

2224. What is the outfall from Windermere?—It falls down to Morecambe Bay.

2225. I mean what is the quantity discharged?—I do not know what it is; I have never calculated it.

*Chairman.*

2226. As regards the contributions by the water companies to the Thames Conservancy, the amount was decided upon, after considerable investigation, I think?—The proposition for taxing the water companies was my own, I believe, or I may say that it came out of the Commission of which I was chairman, and if the counsel having charge of that Bill had done as I wanted him to do, instead of the Conservators

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*Mr. R.  
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*Chairman—continued.*

having 4,000 l. or 5,000 l. (I forget what it is) to pay, they would have had 20,000 l.; that sum would have been very well expended in improving the River Thames, in scavenging it, and in keeping it in better order. I have reason to know that the companies would have paid it if they had been pressed.

2227. Was not that question fought out in Committee?—It was only fought out in this way; that there was a compromise. I do not suppose that I am telling secrets out of school; but two of the counsel for the water companies I met at the opera that evening; they smiled, and said, "Well, Mr. Rawlinson, we have got off with 1,000 l. a year, but if you had stuck to your guns you would have got your 5,000 l. each from us." It would not have been more than sixpence per million gallons tax upon them, and it would have been better to have given them power to increase their rates if they had required it.

2228. Are you aware exactly what contribution the water companies make now to the Thames Conservancy?—I think it is 1,000 l. a year each.

2229. I may inform you that it is more than that?—I was not aware of that.

*Sir Charles Russell.*

2230. How many companies are there?—I think there were four companies then.

*Chairman.*

2231. Supposing the water companies had been taxed to that extent, would they have felt it necessary to increase the rates?—No, it would have been a mere fraction per 1,000 gallons; a mere fraction of a farthing.

2232. Supposing your embankment scheme were carried out, you are unable to inform the Committee to what extent it ought to be carried out?—It would depend entirely upon the condition that the land is in, with regard to the embankment. In the purely agricultural districts, any embanking must necessarily be for the benefit of the land. If the landowners do not want the river embanking, they must leave it as it is. For a city like Oxford, where it is necessary for its own protection that it should keep the water off its streets and off the meadows which are in close proximity, it would be quite possible to embank Oxford, and leave the River Thames to do as it likes; the only difference would be, that if you embanked Oxford, and did not embank the opposite side of the river, you would shut the water off from the area which you embanked, and there might be an action brought against you for damaging the opposite side of the river.

2233. Must your embankment be necessarily continuous?—It would be as continuous as the area flooded.

2234. And I suppose you are unable to inform the Committee at all, or give any rough estimate what it would cost?—No, I could not.

*Chairman—continued.*

2235. But it would be enormous?—No, it would not be enormous for Oxford. You could isolate Oxford just the same as West Ham and the Isle of Dogs are isolated by an embankment, and prevent the river coming on the land which is now flooded. I daresay it would be necessary to lower some of the weirs, because the Oxford people would not give up the streams that run down through portions of their ground, which streams are used for boating purposes and ornamental purposes, and they would not submit to have parallel banks there; they would rather submit to the occasional flooding, I think.

2236. What distance on an average would you propose that the embankment should be placed from the sides of the river; it would vary, of course, considerably, but what would be your rule?—That would be entirely for the consideration of the landowners.

2237. Then in order to carry out this, you, of course, propose that the landowners should be rated?—The landowners must necessarily be rated for that which is to benefit them, and if they are rated then they must be represented.

2238. You are aware of the system of rating adopted by the Drainage Commissioners, of all lands affected by the floods five feet above high-watermark?—No, I have not paid attention to it.

2239. Do you think that a fair system?—I should think it would be; it is assumed that the five feet above would be affected through the subsoil. I was asked a question in the House of Lords Committee, if the land embanked would not be liable to be flooded through its subsoil; that is to say, if an embankment shut the water off the surface, whether it would not rise and flood the land through the subsoil; and my reply was that I did not think it would; and I gave the instance of Carlisle, where the subsoil of a large area embanked below the city is of a gravelly nature, to such an extent that all the sewage of the city has been placed upon it for the last 20 years without any subsoil drain, and it has never flooded the surface; although the water rises in floods 15 or 20 feet above the surface in the river outside the banks it never remains up long enough to flood it; no visible water ever comes on the surface.

*Mr. Samuelson.*

2240. Is the bank carried down very deep there?—The river is embanked, and it is a very considerable height, considering that the water rises 20 feet.

2241. Was the bank carried from the surface?—Yes.

2242. Not puddled below the surface?—No, I think not; a considerable portion of it, I have understood, was made in times of distress, in order to find work for the distressed operatives in the district.

*Friday, 22nd June 1877.*

## MEMBERS PRESENT:

Mr. Coope.  
Mr. Cartwright.  
Admiral Egerton.  
Mr. Hall.

Sir Trevor Lawrence.  
Mr. Walter.  
Mr. Watney.

OCTAVIUS EDWARD COOPE, Esq., IN THE CHAIR.

Mr. ROBERT RAWLINSON, C.B., called in; and further Examined.

Mr. Hall.

2243. I SHOULD like to hear your opinion with regard to the embanking of the river. We heard from Sir John Hawkshaw that you must look upon a river as a trough, and that every obstruction tends, of course, to cause a flood; I see, upon reading your evidence, some rather interesting remarks with regard to weirs, and as far as I gather, you seem to think that in such a flood, for instance, as that of last winter, the volume is so great, that the weir is practically of no importance whatever in causing an increase of the flood?—Well, I should not say of no importance, but it is of very little importance.

2244. That is because the water below rises in immensely larger proportion than the water above, as far as I can understand?—The water below, and the water above are received simultaneously; it is the water flowing over the weir with an increased velocity that only rises the water 1-10th or 1-12th of the head that is rising in the river, but a mile or so above the weir, and a mile or so below, the river is rising simultaneously.

2245. So that there is no difference?—No difference practically; that is, always providing that the gradients are similar. The volume of water rising vertically, is in proportion to the capacity of the river and its gradient. The River Thames throughout its course, does not rise anything near so high vertically, in floods, as some other rivers in England and Scotland do.

2246. Why is that?—One reason is that the River Thames has a very much larger area than the rivers which rise so much more. The River Thames has a drainage area of about 5,000 square miles; some of those other rivers have a much smaller area and a much heavier rainfall; they rise from 20 to 23 feet vertically. Now, if you had such a rise in the Thames, the floods would be much more serious than they are at present; but 23 feet rise is a mere trifle compared with what rivers rise in other parts of the world. In South Africa they rise from 70 feet to 80 feet, and in some of the rivers in Australia 120 feet.

2247. As I gather, embanking is the remedy which you propose?—If you are to prevent land flooding, the principal remedy must be embanking.

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Mr. Hall—continued.

2248. I do not know whether you have heard the evidence that we have received, that embanking would be, to some extent, useless in many parts, because of the water rising behind the embankment?—There must be special provision made for that; the water rising behind the embankment must be provided for by arterial drainage; I hold in my hand a report which was prepared in 1866, in which, if you care to look at it, you will find a brief history of the Thames down to the present time, with the remedies which were proposed by the Commission of which I was Chairman, the evils which existed, and the remedies which we proposed to provide for them.

2249. This drainage behind the embankment, another witness told us, could only be carried out where the configuration of the river favoured it; where there was a fall?—I do not know any circumstances under which the configuration of a river would not permit it; it is quite true when you come down to the estuaries of the river, where it is as flat as possible for some score or two of miles, there may be a little difficulty, but the marsh floods are discharged in Lincolnshire and other places.

2250. Is it not your opinion that the expense of this embankment is so enormous that it is practically impossible for us to recommend it?—Oh, no, I think an embankment might be constructed at a very reasonable cost. The depth of the flooding on either side of the Thames is never very great; it rarely rises, as far as my knowledge goes, to more than 3 or 4 feet.

2251. Do you put it at 100 l. a mile?—It might cost more than that I should say, but I have not gone into the calculation.

2252. That would be a very serious increase on the rental, would it not?—No, the floods are either injurious, or not; in some cases they are certainly injurious, in others the landed proprietors say they are not injurious; but where you have house property concerned, in towns such as Oxford, Reading, and the other towns which are flooded, there it becomes a very different question, but I cannot imagine that Parliament would tax the land to prevent Oxford being flooded.

2253. You think the house property must bear its

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Mr. Hall—continued.

its share?—Yes. Oxford is, at this moment, spending 150,000 £. in properly sewerage the city, and it will take away from the river something like 2,000,000 gallons per day, which it proposes to distribute, by pumping, over a certain area of land which has been purchased, and but a very small portion of that water will get back into the river again; but this will be a mere flea-bite as compared with the volume of the floods.

2254. Does not the very fact of Oxford having done that, seem to show that they have done their share with other towns situated in like manner along the banks of the Thames?—Both Reading and Oxford are spending very large sums for sewerage proper, and to prevent the pollution of the Thames, but it does not follow that that is to protect them from the river floods.

2255. Does not the very fact of their preventing the pollution of the river, increase the income of the people who have charge of the river, and who take that money from the water companies?—In which way?

2256. The Conservators now get a certain amount of money from the water companies because the river is made pure?—They get a certain amount, but one of the conditions supposed to be contingent upon that was, that they would better scavenge the river than it had been heretofore; that the equivalent which they would give for the money taken from the companies would be the better cleansing of the river than formerly, such as the removal of weeds and the proper dredging at places.

2257. And sewerage?—No, they have nothing to do with the sewage except to forbid it.

2258. The very fact of their forbidding it enables them to get the money for the water?—I do not see that.

2259. Will you explain, please, why you do not see that?—The two things are, in my opinion, distinct, if they did not get a farthing from the companies the law would forbid the pollution of the Thames, and it has armed the Conservators with the authority of putting that law into execution; but that is not at all contingent upon any rental from the companies, so far as I know.

2260. They surely would not get the same rental from the companies would they, if they did not get the sewerage kept out of the Thames?—I do not think the one hinges upon the other at all, and I do not believe one was given as an equivalent for the other, and I had something to do with its being given.

2261. But still you can quite imagine that the town would show a claim of that sort, and, therefore, would have a *prima facie* case for putting the principal portion of the burthen upon the land?—No, I think not; I think the two things are entirely distinct; the prevention of pollution is certainly to preserve the river clean, and as the river happens to be the great source of the supply of water to the metropolis, it certainly tends to the purity of that water; but, I think, if Parliament, at that time, had given anything like a proportionate sum, or rather, had said, that the companies should pay anything like a sum that would be equivalent to enable the Conservators to do their duty to the Thames, that would be much more than they pay at present: more than a thousand a year each.

2262. Then, with regard to the governing power of the river, is it your opinion that it is possible to have more than one authority over the

Mr. Hall—continued.

whole reach of the river, or do you think we can divide the jurisdiction?—I do not think you can judiciously divide the jurisdiction of the main stream; but the river area includes a number of tributaries, the list of which is here; the combined area of which is almost as great as that of the main stream. The inquiry, as reported upon in this report, was as to the main stream, and three miles on either side. We intended to have inquired into the tributaries, but we had not time. The River Lea, which was the next river we inquired into, upon the recommendation of the Commission, was put under one jurisdiction. The drainage area of the River Lea, and the tributaries as well, is under one jurisdiction.

2263. What is that area?—The area is just one-tenth of the Thames. The Thames is 5,162 square miles, and the River Lea is about 500 square miles.

2264. Then, in your opinion, the tributaries should be put under one authority, and the main stream under another?—No. I would put the entire river area under one authority for general purposes, and the tributaries might be put under sub-boards; but having no power to carry out any important works without first laying their plans before the main body of Conservators and getting their assent, so that there should be uniformity throughout the entire area.

2265. That there should be one body with sub-committees?—With sub-boards. With regard to the Aire and Calder, which was the next river we inquired into, that being studded with manufactories, and the interests being so diverse, and so opposed, we sketched out a plan by which the area of the main river should be broken up into sub-areas; that these sub-areas should be put under local jurisdiction; the local body governing the area being a representative body, which would have to be the taxing body; the general conservancy board having supervision over the whole of that area, and one general national conservancy board, having a Minister of state at its head, to take charge of the whole areas throughout the kingdom. I would not permit a stone to be moved in a river, either to be taken up or put down, without plans being first submitted to the local board, and then, in case of dispute, there should be a power of appeal to the general board, just in fact as we have now under the Local Government Board. With regard to town improvements, the sewerage of towns and all works connected with sanitary measures, is in the hands of local boards, and the local boards devise their own works; they submit their schemes to the Central Board, and ask leave to borrow money, for which they mortgage the rates; if there is a dispute in the district, an appeal is made to the general board, and an inspector may be sent down to hear the matters in dispute, and report to the President, who has power to decide. Similar regulations, I conceive, should be made with regard to rivers. At present rivers are abused in every form in which you can conceive that they could be abused. A riparian owner, although it is contrary to the existing law, yet as there is no person to put that law in motion, goes and embanks or diverts a river, or builds upon the edge of the river, discharges his refuse into it, and, in fact, deals with it just as he likes. I have heard of one instance, boundaries generally being in the centre of a river, where the riparian owner purchased the land on one side of the river, and because his plan

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plan showed that the divisional line was in the centre of the stream, absolutely built his mill and all his works upon that centre line, caring nothing about what became of the stream on the opposite side. There was no person who did check him, and the buildings exist there now. Again, rivers are always altering their courses; they are always washing away their banks on one side, and perhaps depositing on another. A riparian owner, without any appeal to any person, can protect his own land. He may pile it, or build retaining walls, or do what he likes, and that may throw the current right over on his neighbour's land opposite, and do him a great deal of mischief, and there is no local board control over it.

2266. With regard to representation, have you any ideas that you can lay before the Committee as to that. If there is to be one central body, of course there will be a great cry for proper representation on that body, because the whole of the Thames is a very large area?—There was a difficulty about this representation when this inquiry was being made, and if you look into that report, you will find that the governing body at that time, the Commissioners, consisted of the following *ex officio* members, viz.: Members of Parliament for the counties of Wilts, Gloucester, Berks, and Bucks, and so on; at all events, there were upwards of 700 of them. We suggested in that report that their power as Commissioners should be done away with, and that they should be an elective body, a body to elect representatives, to be joined with the other Conservators who sit in London. I think that is the way that the Conservancy Board is now constituted. The body who were the Commissioners before, are now the electors.

2267. They choose two or three out of their number?—Yes.

2268. And the result of that is, when they get on the board, of course they find that a certain portion of the river, as at present constituted, the upper portion is very inadequately represented as far as numbers are concerned?—That may be, but the remedy for that will be, I should say, to add to their number, and to make sub-committees. When a town's area becomes too large for the entire area to elect representatives, it is subdivided into wards. I do not know whether you could sub-divide the river into wards, so that they should elect their own representatives in a particular ward, or a particular area of the river, to represent the interest of that ward, but that might be considered.

2269. With regard to the mill-owners, do you consider they ought to be specially represented?—So long as the mill-owners remain there, I think it is only just that they should have a representative, if they are to be taxed or meddled with at all.

2270. I suppose you consider that the agricultural interest, and the mill-owning interest, as far as water is concerned, are very often antagonistic?—Well, they may be; the miller's interest is to get as much as he can out of the water; of course the miller cannot work when the river is in flood, therefore I can quite conceive that he can have no interest in the injurious flooding of the land; anything that would remove injurious flooding, I do not imagine could injuriously affect the mill, because, when the flood is out, the mill is idle. I do not know whether you

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are aware of it, but there is a return here which is made every month; it is made out by the inspector of the water companies, and you have every detail there of the volume of water that the several companies have power to take, and the volume that they do take, and the volume that is supplied to London. I will leave that document with you, if you please.

Chairman.

2270\*. This is Major Bolton's report?—Major Bolton's return.

Mr. Hall.

2271. Go back for one moment to this authority; I think I understood you to say that the central body should have power over the whole stream, and its tributaries, and that the small local bodies should work under them as sub-boards?—Yes.

2272. Then the central authority would be the authority to put these local boards into motion?—No.

2273. What would put them in motion?—Their own wants. Constitute a local authority upon one of these tributary rivers, having charge of that area, then the central body would ordinarily have nothing to do with putting it in motion; they would be the controlling body.

2274. Take the case of the Cherwell, which I think you know very well, that is in a foul state; supposing the local authority on the Cherwell should not move, do you propose that the central body should have some power to make it move?—Yes, there may be power then for the central authority to serve notices upon them, and there is a power in the "Public Health Act" that if a local district will not do its duty, the central authority, after giving notice, can supersede it, and in fact, can devise and execute the works and rate the district for them.

2275. They can do the work, in fact, for it?—Yes; it is a power that I, however, protest against, and I think it ought not to be used in this country except very sparingly.

2276. If it is not used, and you have your main authority to take care of the main stream, and these local authorities neglect their duty, is not the money spent by the main authority over the main stream to a great extent wasted, owing to these local authorities not doing their duty in regard to the tributaries?—I think you need not fear that the local authorities will not do their duty. The Rivers Pollution Act, as far as pollution goes, will make them do their duty. That Act comes into force at the end of this Session, and the power there will rest with the rivers pollution authority, and the Conservancy Board will have that at their back, to put the screw upon any local authority which neglects its duty.

2277. Will the Conservancy Board be an agent to put this Act in force?—The Local Government Board will be the agent; I am the engineer appointed at present under the Rivers Pollution Act.

Mr. Watney.

2278. There is one question about embanking; I do not quite understand what you do with the water, that is, behind the embankment on the land, supposing you raised the embankment higher than the land?—Will you allow me to read

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read a passage from this report, page 28, "The great bulk of the water constituting extreme floods cannot be contained in reservoirs; it cannot be stopped in its course, and when it comes the object is to deal with it so that it may occasion a minimum amount of mischief. It is necessary for this purpose to provide a larger channel by means of artificial embankments. These embankments should be constructed in connection with irrigation and also with arterial drainage. River water irrigation has not been practised on any great scale in Great Britain," and so on. Then, "It would be a great mistake, therefore, to construct the embankments so as to shut out the water altogether." Then as to drainage: "If the system be carried out of dividing the valley into a series of districts, and draining each district through the next district on the lower level to the river, the main drains would run at the back of the embankments, and the embankments would serve to cut off the communication of the drains with the river. In short, what is required is river embankments with main drains, floodgates, and sluices to enable riparian proprietors to shut out, admit, restrain, retain, or pass off the flood of the river at will. But such embankments must be systematically constructed under some general supervision. Partial embankments have already been here and there carried out by individuals to their own advantage, as the evidence shows, but in some instances to the injury of their neighbours. The embankment on one side of the river may throw the water out more on the other. Embankments on both margins in one district may back up the water on the district above, and precipitate it violently on the district below. These embankments and drainage works should, in our opinion, be carried out, and afterwards be superintended by the body having the government of the whole river, which body should, for the purpose, be invested with all necessary powers; amongst others, power to levy a tax for the construction and maintenance of the works upon the land falling within the limit of their beneficial operation."

2279. Then if I understand your answer, it is this, that you would have a small river running behind these embankments as well as the large river in front?—No; a catch-water drain would take the water falling upon the embanked area, and convey it into a reach of the river where the level would permit it to enter.

2280. Lower down?—Yes.

2281. But if the bank were raised lower down you would have the same difficulty; it would practically resolve itself into a small river on each side of the main river?—No, the River Thames falls something like 12 to 18 inches per mile, so that you would not have to go very far before you would be enabled to deliver the drainage of the upper section into the river below, without making a parallel river all the length of the main river.

2282. Not all the length, but it might be for some considerable distance?—Some two or three miles in some cases.

2283. And that would be as nearly as objectionable as the floods, would it not?—Oh, dear no, because it would not be permitted to rise over its own banks; it would be in proportion to the volume of water it had to take, and it would

Mr. Watney—continued.

never permit the land on either side of it to be flooded.

2284. I do not know whether you considered, in this report which you made, what area it was advisable to spread the taxation over for the making of these necessary works?—No, we could not go into that. I think there is something in the Drainage Area Act which contemplates taking a certain portion of the land; that would be contoured with a line 4 or 5 feet above the highest flood.

2285. You do not take the whole water-shed of the river, and you do not suggest that the whole water-shed of the Thames would be liable to be drained?—There would be a dreadful outcry if you taxed a man ten miles away for land on the banks of the river.

2286. Not if the water from his land drained into the Thames?—Certainly; and the rain that falls upon that area goes down into the Thames.

2287. Do you think that there is any great hardship in that?—It would lower the amount of the rate very much. We do now under the Local Government Board, tax land for town improvements, only where the area embraces a certain amount of agricultural land and it is rated for the improvements of the town upon one-fourth of its value.

2288. I think Sir John Hawkshaw, in his evidence the other day, said that that was done somewhere in the Fens?—Very probably it is, but I am not acquainted with the Fen district. Sir John Hawkshaw has been employed there.

Mr. Walter.

2289. All drainage, I presume, finds its way ultimately into some river or other?—All the water falling upon the land, or rather I must qualify that; I daresay the Committee will be surprised to hear how little of the water falling on the land does find its way into a river of any kind. Take the River Thames and the River Lea, where there have been tolerably accurate gaugings taken; you take the rain-fall of the Thames as 27 inches, and of the Lea at about 24 inches. Then the entire volume of water that is measurable as flowing down the river, either in floods or in springs, does not amount to much more than 7 inches out of 27, the 20 inches being re-evaporated, and passing into the atmosphere neither sinking into the subsoil, nor flowing off in springs. The dry weather flow of the Thames being spring-water.

2290. Is that the case where the land drains into deep ditches, such as you find in most parts of the country?—Yes; of course it varies according to the character of the surface, but you may take it as a rule that throughout Great Britain the greater portion of the water which falls upon the surface goes back again into the atmosphere, and never flows down any river. During such weather as this, this rain which has fallen would have to fall very heavily for a week, before it would flood the ditches and watercourses.

Sir Trevor Lawrence.

2291. The summer rain takes a long time, but the effects of the winter rains are speedily found?—When you have floods, it is when water falls upon water and flows off water. The subsoil must be surcharged with the previous rain, and the

Sir Trevor Lawrence—continued.

the rain must be continuous, or you would never have a great flood.

Mr. Walter.

2292. I do not know whether I am repeating any question which has been asked already, but I wish to know whether you think that similar bodies to the Thames Conservancy Board should be constituted for the effluents of the Thames, and the other rivers, including under that term all streams which ultimately find their way into the Thames. The point of my question is to direct your attention to whether there should be any public bodies with power to watch any abuses of the existing rights of mill-owners, in the shape of raising the height of their heads, so as to throw back the water upon the land above them?—My idea, which has been worked carefully out, after having made special inquiries into these rivers, is this: That it would be necessary to constitute a local authority, and that you should provide by your legislation that no individual millowner, riparian owner, or person in connection with any stream or river, should do anything upon that stream or river without first devising and preparing a plan of the work which he wishes to do, and that he should submit that in the first instance to the local authority having jurisdiction over that special area. Then, if it comes into dispute, the Conservancy Board having jurisdiction over the whole area should step in, and if that dispute is not settled between the two, it should be referred to the general board in London; just as in a town no man can begin to build his house without laying his plans before the Local board; but he, as a ratepayer and owner, is an elector of that local board; he is one of the members electing it, his influence is there, and he can influence others; but he cannot alter his house, or cannot even alter any outbuildings without laying his plan before the local board. Now, the general board in London has nothing to say to that, except the local authority gets into a dispute, and a person thinks he is grievously injured by something that this local board has done. Then he can appeal to the General Board, and if they conceive that he has ground for his appeal, they may make special inquiry; and I think that should be the case on a river.

2293. What do you understand to be the rights of riparian owners, as distinguished from mill-owners, over the water and bed of the river; you say you would not allow a stone to be thrown in, or a stone to be taken out without the leave of somebody. What right has the riparian owner over the water; how much may he take out?—That I really cannot answer.

2294. I suppose a person living on the river, may take a bucket of water out?—A person who lives upon a river, may use it, I believe, upon his own land, but he must not abuse it, he must not stop it, he must let it flow on to his neighbour's land below in the same way that it has flowed from time immemorial. But, at present, a riparian owner up the stream not only uses the river, but abuses it in any way he thinks proper, without let or hinderance; for instance, all through the districts of Lancashire and Yorkshire there are hundreds of mill-owners who send in regularly hundreds of tons of ashes a year; they tip them on the edge of the stream, and let the first flood take them away.

2295. That would come under the head of  
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Mr. Walter—continued.

pollution, I suppose?—Obstruction, I should think.

2296. But save in the cases of obstruction and pollution, and hinderance to navigation, and hinderance to the rights of mill-owners, I wish to know whether riparian owners have or have not any unlimited power over the water for all other purposes?—That I am not lawyer enough to answer; I do not know what their powers are.

2297. With regard to the money paid by the water companies to the Conservancy Board, I do not understand what is the *quid pro quo* which the Conservancy Board give to the water companies in return for that payment?—They have had these works upon the Thames to put in order, and they should, for that money, better scavenge the river than heretofore; for instance, we have had in evidence, and we know for a fact, that it was very common to see floating carcasses: dead dogs, cats, pigs, and other cases floating in the river, and becoming putrid, and remaining for weeks on the surface of the water in the upper and lower reaches. In my opinion, the duty of Conservators would be at once by the work-people to remove those carcasses and bury them.

2298. Besides the removing of dead cats and dogs, what else do the Conservancy Board do for the 6,000 £. a year which they get from the water companies?—They ought to cleanse the river of weeds, cut them at certain periods, or take them out of the river, in fact, and attend to the general purity of the stream.

2299. Have the water companies ever made any complaint to or demand on the Conservancy Board for neglecting those duties?—That I do not know; they would not complain to me.

2300. But as far as the general pollution of the river goes, as generally understood by pollution, namely, the influx of sewerage in the river, the prevention of that is done by the ratepayers at their own expense?—It is.

2301. The Conservancy Board do not help in that at all?—They do not. All that the Conservators do is to give notice to the authority offending that they shall prosecute them if they continue after a certain period.

2302. That is simply a formal notice?—Yes.

2303. Do you think there is any ground why the water companies should be called upon to pay more for such services?—I think so myself, and I think it would be in the interests of the companies; I do not see why trading companies should take that water from the river and pay nothing whatever towards the maintenance of the river. Until the Conservators got the powers which they obtained from the Act passed after this report, the river works were going to destruction.

2304. But would it not be reasonable for them to pay the money to those who had incurred the expense of purifying the river, namely, the ratepayers, and those who had been put to the enormous expense which the inhabitants of the town have to pay for executing drainage works?—No, I think not. It is a duty that each locality is liable to, and it is reasonable to expect that they will fulfil it at their own costs and charges.

2305. If the water does not belong to the Thames Conservancy Board, why should they be paid by the water companies for abstracting  
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a certain portion of it:—Simply because if there is no authority having power to maintain the river, it must go to ruin, as it was going.

2306. It is a matter of taxation; they must get the money somehow?—Just so; and I think myself that the water companies are very fairly liable to pay their proportion towards that taxation. They take the water of the river, they sell it at a profit, and I know of no other instance where companies can take the enormous volumes of water that are taken there at no cost to themselves.

2307. But do you hold that the water belongs to the Thames Conservancy Board, or that it belongs rather to the riparian owners?—If Parliament arms them with power to levy this rate, I say the water belongs to the Conservancy Board. I do not see how you are to distribute the ownership amongst the towns, or amongst the riparian owners, with any benefit to anybody. They certainly would have no power to do what the Conservators do.

Sir *Trevor Lawrence*.

2308. Are you of opinion, in case of great floods on the Thames such we had last year, and in 1852, that any of the alterations, which I call small alterations, with regard to the locks and weirs, and similar small alterations, would have a material effect in controlling the floods?—I think not.

2309. In fact, in the valleys of all great rivers these floods do occur, and, as far as engineering operations go, they are generally left uncontrolled; is not that so?—It is.

2310. So that any alteration which, in your opinion, could be made, without great engineering works being undertaken, would only really deal with the small and ordinary floods?—That is all.

Mr. *Walter*.

2311. Do weeds, in your opinion, tend to the pollution or the purification of the river?—That is a very important question, and I have had to consider it and to answer it with regard to India, both as regards weeds and fish. There is one fact, which may be taken for what it is worth, that any native of an Eastern country would refrain from drinking of any water that did not grow weeds; he would not touch it. If he saw bright, clear water without weeds in it, he would avoid it. There is no doubt that weeds to some extent tend to purify the rivers, but at the same time they may tend to pollute them. In the Thames, as it has been, and as it is, they certainly tend to pollute the water, because the sewage matter coming down from the towns, and from the tributaries, gets entangled in the weeds, and sets up putridity; consequently the cleaner you can have the river the better, it may be, for the purity of the water.

2312. Probably, in the upper reaches of the Thames, weeds would tend to keep the river pure, but in the lower reaches they would tend to pollute it?—Just so.

2313. Supposing sewage to be effectually kept out of the river, the weeds could no longer be considered as contributing to its pollution?—They need not necessarily be considered as contributing to its pollution, but I think it would be necessary to keep them under control.

2314. I ask the question with reference to the water companies, because if it is part of the

Mr. *Walter*—continued.

duty of the Conservancy to cut the weeds, and the weeds tend to the purification of the river, that cannot benefit the water companies?—No, they may not take that view of it; but weeds do injure the river by obstructing the flow of the water, and they may obstruct it to such an extent as to very injuriously affect the river during floods. The American weed, for instance, which was introduced some years ago, has actually grown up some of our smaller streams, and blocked the entire course of them. It, however, only grows under certain conditions; the water must be spring water, and it must not have a depth of more than four feet, neither must the velocity of the current be greater than about one-and-a-half miles per hour. When I was taking evidence at Oxford upon the Thames, I asked Professor Daubeny if it was true that that weed, which had been introduced some 30 years ago, was exhausting itself, and he said he had no evidence upon that head; but he said, with regard to that particular weed, it was not a nuisance in Canada, where it came from, the same as it has become in the rivers in England, and he said the ordinary water-cress taken into New Zealand was developing itself in their streams to an extent similar to this American weed, and in the smaller streams had entirely grown them up, the same as this weed has here.

*Chairman*.

2315. With regard to the pollution of rivers, you stated that hundreds of tons of ashes, in Lancashire, were thrown into one river?—Yes; thousands of tons.

2316. Is not that illegal?—I do not know whether it is illegal or not, I only know that no person has ever taken action to stop it.

2317. If a foul sewer is allowed to run into a river, is it not illegal?—It will be illegal at the end of this Session.

2318. Is it not already?—It is, if a person chooses to take action himself, and to declare that it is a nuisance injurious to health, and takes the party into the Vice Chancellor's Court, he will then get a restraining injunction.

2319. Under the present state of the law it is illegal to pollute rivers?—Yes, it is.

2320. Under those circumstances, it is equally illegal to pollute the Thames as any other river?—Yes.

2321. As regards the claim of the Thames Conservancy upon the water companies, the owners of property and others, and towns upon the Thames, are bound to keep out pollution, and have carried out great works with that object on the river?—They have carried out and are carrying out those works; hardly any of them are completed, but they are being carried out. Here and Windsor, Reading, Oxford, and a number of other towns.

2322. The Thames Conservancy having made a claim upon the water companies, under your advice, for the payment of 20,000 *l.* a year, the matter was fought out in Committee?—I think it was not fought out very severely. I suggested, I think, either 4,000 *l.* or 5,000 *l.* a year from each company, but I think the counsel for the Board of Trade declined to act upon the suggestion, and never pressed it before the Committee.

2323. Not a claim of 20,000 *l.*?—I think not, I do not remember it. It was mentioned in the Committee,

*Chairman—continued.*

Committee, and I suggested it, and I know I was very much annoyed that the counsel would not take that view of it.

2324. As regards the mode of rating of the Drainage Commissioners, by which the incidence of the rate shall be upon all property five feet above the flood mark according to the Ordnance Survey, do you consider that an equitable mode of rating?—I really could not answer that without having had time to give it more consideration. It would operate very unequally. Where the gradients were tolerably steep, it might not encroach the width of this room upon a landowner's property, in another case it might cover in scores of acres.

2325. Mr. Leach has stated in a report of July 1864, that the weirs have been, most of them, so constructed as to offer great impediments to the escape of flood-water; are you of the same opinion?—The weirs will obstruct ordinary floods, but as I stated in my evidence, whether there is a weir or there is not, in my opinion the great overwhelming floods would do about as much injury, if the weirs were swept away, as they do now if nothing else were done.

2326. Mr. Leach has further stated in evidence that, supposing certain works were undertaken, especially in increasing the tumbling bays, straightening the river at certain parts, and dredging the bed of the river, that, except in an extraordinary flood like that of this last winter, the river would be sufficient to carry off the flood-waters?—The river could be very materially improved, there is no doubt, by the works suggested by Mr. Leach, and no person knows better how to suggest them, but if those works were carried out in the most perfect manner, and if the river were left unimbanked, it would be liable to be flooded almost as badly as it is at present.

2327. Nothing would be satisfactory to your mind, but an embankment upon both sides of the river?—I cannot conceive any other form of work which is available for preventing the flooding of the land.

2328. And you are unable to inform the Committee as to what extent those banks should be carried, or the approximate amount of the expense of carrying out the work?—I have no idea. It is a thing that I could not possibly answer without going into calculations, which I have no means of doing.

2329. Are you aware that the Duke of Richmond's Commission, anticipating the requirements of the water supply of the metropolis, recommended, not immediately, but at some future time, the formation of storage reservoirs for storing flood waters?—Yes.

2330. Do you consider the time is approaching when such a work will be needful?—If the water supply of the metropolis is improved to the greatest extent that it can be improved, making the Thames available, reservoirs of that class and character would be formed upon the upper portions of the river, because you would not affect the river more than at present, if you made spring water available, and the dry weather flow of the Thames is really spring water. If you embank the valleys, so as to impound that spring water, and bring it down to London, you might supply London for the most part with spring water, and not with the polluted water from the main stream, pumped as it now is just above Teddington Lock.

2331. Then by making storage reservoirs, you  
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*Chairman—continued.*

believe that not only the quantity would be increased in the summer months, but that the quality would be improved?—I do not say that the quantity would be increased.

2332. I take that for granted, having storage water, it must be increased?—It would be increased to the amount of the flood-water storage, but it would be quite possible to supply the metropolis, and have comparatively small storage, by collecting the springs in the upper rivers and upper streams; you could almost collect the entire volume of water you want for London with very little storage.

*Mr. Walter.*

2333. Do you know, from experience, that the configuration of the lands in the upper parts of the Thames lends itself to the construction of storage reservoirs?—I have not examined them with that view, but I had some 20 years ago to make an exhaustive examination of districts in the vicinity of the Thames with regard to spring water, and from the Bagshot Land area I found that we could have collected something like 50 million gallons of spring water per day; but upon rivers such as the Thames and its tributaries, especially on the length of the river, there are valleys and there are points on the river, where, by embankments across, you could make impounding reservoirs. Some rivers offer greater facilities than others, but I have no doubt that sites can be found upon the tributaries of the Thames.

*Mr. Hall.*

2334. You think that the water companies may be fairly called upon to pay even a larger sum than they pay now, because the water must be looked upon as their stock in trade, and they may be fairly called upon to pay the amount to the Thames Conservancy, because you look upon the Thames Conservancy as the owners of the water?—I do not think I should say that they are the owners of the water. They are the authority that you may fairly call upon more efficiently to cleanse the river, and if there were any injurious property in the water, from either the floating nuisances, such as I have mentioned, or from the undue accumulation of weeds, or from any improper usage of the river at any particular point, the Conservancy is a body that has the authority, and the power to look after the river in those respects.

2335. But would you not admit that those who spend their money in cleansing the river would be the proper recipients of any of that money from the water companies?—You mean the towns.

2336. Yes?—I do not see what they have to do at all with it; their duties are of another kind altogether.

2337. But still you admit that they improve the value of the property, taking it for granted that the water is the property of the Thames Conservancy?—They unquestionably, so far as they are compelled to keep their sewage out of the river, improve its quality and its purity.

2338. Do you think that if the landowners, or the Thames Valley Drainage Commissioners, scoured and cleaned the river, and improved the reaches of the Thames and its tributaries, they would have any claim upon this money which would be received of the water companies?—No, I do not think they would.

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2339. Is

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Mr. Hall—continued.

2339. Is it true to say that they also improve your property?—So far as they carry out their works efficiently they would tend to preserve the river in good order, and to keep the water more pure.

2340. And therefore to improve your pro-

Mr. Hall—continued.

perty?—I cannot look upon the water of the river as anybody's property.

2341. I thought I understood you to say that you considered it was the property of the Thames Conservancy?—No; I do not see how they have acquired it as a property.

Sir GILBERT EAST, Bart., called in; and Examined.

Chairman.

Sir G. East,  
Bart.

2342. You are a considerable landowner on the banks of the Thames?—Yes, at Hurley.

2343. Whereabouts is that?—It is just above Marlow.

2344. Near Maidenhead?—Yes, some distance above Maidenhead.

2345. To what distance does your land extend there?—I suppose only about a mile, but I formerly owned a property above Lechlade, which extended three miles along the river; so I am well acquainted with the results of the floods.

2346. You are not possessed of that property at Lechlade now?—No.

2347. You have become fully aware of the influence of the floods in the upper part of the Thames?—Yes.

2348. Is your land pasture or arable?—Up in Gloucestershire, where it was affected, it was nearly all pasture.

2349. And at Marlow?—Part of that is arable; but that is only affected in the very bad floods.

2350. Will you kindly tell the Committee what effect the floods have had upon your property, both at Lechlade and Marlow?—I think the way to explain that best will be this: at the time the Thames Conservancy proposed to introduce a Bill in 1874, it was opposed by all the landowners round, and I was chairman of the district committee at the time; the effect was, that we prevented the Bill being introduced; but at that time I asked all my tenants what the effect would be of losing the flood, and they said that if the Bill was passed, they would have to ask me to reduce their rent at least 5 s. an acre; and the same with regard to my property at Hurley. The meadows which are at present worth, I suppose, about 3 l. an acre, if the floods were taken away, would be reduced to the average of the land round about, 35 s. or 37 s. an acre.

2351. Have you any system of irrigation?—None.

2352. It is simply the floods passing over the land?—Yes; up in Gloucestershire, and all above Lechlade, the whole way up, they have some plan of a small embankment, and they wait until the water is to a certain height, and then they break through the embankment and let the water run over the land in the direction they wish.

2353. What is the effect of the embankment; advantageous or injurious?—It is advantageous in this way: that they get a large body of water over the land at the right time, instead of having it come slowly.

2354. Suppose the whole river were embanked upon both sides, with sluices to allow of the water, when needed, flowing on to the land, and with power to control the flood-water within its banks, would that be advantageous to the land, or the reverse?—The reverse. I do not quite see how it could be done; because in some parts

Chairman—continued.

they would not want the water at the same time as others. The water rises at Marlow Weir very much; it was level in the time of the flood, so that the water must have risen 6 feet or more; and if all this water is to be put into embankments, you would be obliged to have embankments of 12 feet high. I do not see how that is to be done. A low embankment would be very injurious, because if you got a very high flood you would have this wash from the embankment all over your land.

Admiral Egerton.

2355. You do not see your way to embanking, then?—Well, we do not want to embank when there is an ordinary flood, and for an extraordinary flood it would be an enormous embankment, and if, whatever it was composed of, gave way, it would destroy the crops all round.

Mr. Walter.

2356. For how long a time was the water over your land during the floods of last winter?—We had two or three floods, but I do not think it was more than a week at a time, except on some low lying fields, where it remained nearly all the winter.

Sir Trevor Lawrence.

2357. And it did no injury?—None at all. I am wrong there; because it came into one or two arable fields in patches, and if there was wheat there, it destroyed it; but so the rainfall did on the hills. There was no injury done to the land in the Valley of the Thames, more than there was done on the hills. The Thames Conservancy have very much improved the river, and now the floods run off quicker than they used to.

Mr. Walter.

2358. Then you look upon a flood rather as the inhabitants of the Nile do; as an annual blessing?—Yes; and I think also a great many people who have not got any land at all; the poor people of Maidenhead, Windsor, and other towns, pray for a flood every year, so as to get money from the Mansion House Relief Fund, and they think a flood is a regular benefit to them.

Mr. Hall.

2359. Have you any experience of summer floods?—Yes; the summer floods are injurious, if they come just as the people are cutting the hay; but it is very rarely we get a summer flood.

2360. As a rule you get no complaints from your tenants of damage by floods?—No, none at all; and not only my tenants, but all my neighbours, like a flood.

2361. Did you hear Mr. Rawlinson's evidence just now?—Yes.

2362. He

Mr. Hall—continued.

2362. He seems to be of opinion, as I gathered, that embanking is the correct thing, and that the rise of water is nothing like so as you seem to imagine it to be; have you looked at it in an engineering point of view at all?—I have not measured it, but I am looking at the height of the weirs when you are below in a boat; in some places they must be more than six feet high; for instance, down at Teddington it is a great deal more than six feet; I should say certainly it is a great deal more than Mr. Rawlinson said, four feet, because I know from the weir at Hurley; the fall is more than four feet, and the water was level there.

2363. Supposing that embankment could be carried out at a moderate outlay; say a four feet, or a five feet embankment, giving you, by means of sluices, the control of the floods; do you not think that, from the fact of thereby escaping the damage of summer floods, it would be worth your while to submit to a rate?—No, I do not think so; it is so very rare that we get a summer flood, and if we had, it is very rarely that it does any damage; it has to come just at one particular time to do damage; so that I think the damage done would be very much less than the rate.

2364. You prefer the damage to the rate?—Yes, because I think the amount would be very much less.

2365. Have you any complaint in your part of the world as to the action of the Thames Conservancy?—No; I myself, and I think all the neighbouring landowners, think that the Conservancy have done uncommonly well with the means they have got; anyone who can remember the river under the old Thames Commissioners, must see an enormous change now.

2366. Do you hear any complaints in your part of the world about the inefficient representation on the Conservancy Board?—Yes, sometimes I hear it, but I do not think there is really any great feeling against them.

2367. Are any of your neighbours on the Conservancy Board?—I do not know whether Mr. Vansittart is at present, but he was, and Sir Roger Palmer, at Maidenhead, is now.

2368. You have not heard any complaints from them that when they attended the sittings of the Board, matters relating to the lower parts of the river were discussed, and other matters relating to the upper portions of the river left out?—I think not of late years; I did at first hear of something to that effect, but that was when the Conservators first took it over. Latterly I have not heard that, and, in fact, I think they have done very well indeed.

2369. Do you think that the feeling of satisfaction with the Conservancy is pretty general in your district?—Yes.

Mr. Cartwright.

2370. I think you said the Conservancy had improved the state of the river?—Very much so.

2371. Can you refer to any works which the Conservancy has done for the improvement of the river?—There are several locks and weirs, some of which have been entirely rebuilt.

Mr. Cartwright—continued.

2372. In your neighbourhood?—Yes, there is a lock which they have entirely rebuilt.

2373. Which lock is that?—Hambleton Lock.

2374. When was that re-built?—Two years ago, I think; in fact, I know the whole of the river from above Oxford down to London.

2375. You are thoroughly acquainted with the river?—Yes.

2376. Will you name the number of works within your own knowledge where the improvement of the river has been due to the works which have been carried out by the Conservancy?—The improvement of the locks, and the improvement of the navigation; and they have also assisted in carrying off the water much quicker after floods.

2377. I mean the actual works of construction?—Yes.

2378. Within how many years?—They are going on every year.

2379. New constructions?—They go on almost every year; I think something has to be done from Teddington upwards every year. They have lately repaired my own lock at Hurley, but I have not been down to see what they have been doing; and also the Hambleton Lock was entirely restored, and Marlow Lock has been restored. There are one or two bad ones, but I suppose they will be improved in time.

Chairman.

2380. Is Maidenhead Bridge near you?—It is by road, not by river.

2381. Below you?—Yes, it is 10 miles by river.

2382. Is that found to be an impediment in times of flood?—No, I have not heard so; it may be to a certain extent an impediment, but not a very great one; you do not see much difference in the level of the water running through.

2383. In times of flood is the water at all higher on the upper side?—Very little, there is not much difference.

Mr. Walter.

2384. Is Marlow supplied with water by a company, or how does it get its water?—I do not know how Marlow is supplied.

2385. Has it executed any sewerage works?—Not that I am aware of; I do not think Marlow is supplied at all with water, each individual supplies his own water; Maidenhead has now got waterworks.

Chairman.

2386. But you would not like to see the river embanked in your neighbourhood on both sides?—No, for several reasons; it would take up a great quantity of room which is now very valuable, and then, if we had a serious flood, it would wash over and do an enormous amount of damage.

2387. Would you be prepared to have your property rated to carry out such a work?—No, certainly not; I should strongly object to it; I should be rated, and lose my rent too, I think.

Sir G. East,  
Bart.

22 June  
1877.

Admiral Sir F. NICOLSON, Bart., C.B. called in; and Examined.

Admiral Sir  
F. Nicolson,  
Bart., C.B.

22 June  
1877.

*Chairman.*

2388. You are the Deputy Chairman of the Thames Conservancy?—Yes.

2389. How long have you been so?—I have been deputy chairman about two years and a half, but I have been on the Board since 1861.

2390. Will you kindly explain to the Committee the Acts under which the Conservancy Board has been formed?—The Conservancy Board was established in 1857, and the composition of the Board then was 12 members, seven being nominated by the Corporation of London, two nominated by the Admiralty, two by the Trinity House, and one by the Board of Trade; we were then 12 members. In 1863 a Select Committee inquired into the proceedings of the Conservancy Board, and from their report I presume I may read two or three short passages, "During five years the exertions of the Conservators have deserved the thanks of those interested in the River Thames. Imperial interests of much importance are concerned in the management of the Thames, for which it is expedient specially to provide. With this object it seems right that the Admiralty and the Board of Trade should continue to nominate members of the Board. It is just and proper that the Corporation of London should have a voice in the conservancy of the river; therefore not less than three should be nominated by the Corporation." That Committee recommended 18 members, three being nominated by the Corporation, two by the Admiralty, two by the Board of Trade, two by the Trinity House, and nine to be elected by ship-owners, barge owners, and steamboat owners, and they recommended that barges should contribute as well as ships and steamboats, to the conservancy fund. I may, however, explain that that recommendation was not carried out exactly.

2391. What was the Board in 1863, did it continue to be twelve members then?—Yes. I am coming now to the first alteration. In 1864 a Select Committee sat upon a Bill brought in, I think, by the Board of Trade. The Vice President of the Board of Trade of that day, Mr. Hutt, was the Chairman of that Committee, and they eventually passed an Act, which we call our Act of 1864, which altered the constituency by adding six members to be elected by various bodies.

2392. In addition to the 12?—In addition to the 12.

2393. Then you were 18 members?—We then became 18. I do not know whether you would care to hear the constituents who elected those six members.

2394. They no longer exist; therefore perhaps you will come to 1866?—They still exist.

2395. But we exist to get your evidence as regards your present constitution?—Of course if the Committee do not care to go into the historical part, I will not go into it. But I want to point out that the Bill of 1866 is based upon a Report of a Committee in 1865. I should like to read what that Committee reported. In 1865 a Committee of the House of Commons was appointed to enquire into the upper district, and that Committee reported, and it is upon the basis of that Committee's Report that the Bill of 1866 is founded; that there were great difficulties with

*Chairman—continued.*

regard to the upper part of the river, that the locks, weirs, and so on, were in a very ruinous state, as every body knows. There was a debt of 88,400 l. upon which no interest had been paid since 1863, the tolls which in 1845 amounted to 14,000 l. a year in round numbers had diminished to 3,000 l., and the excess of expenditure over income in 1864 was 36 l. They further reported, "That the maintenance of the navigation is a benefit to the large water companies of London, to the water supply of Windsor Castle, to many mills and manufactories, to landowners and others. The Committee have considered the expediency with a view both to economy and efficiency of combining under one management the whole of the navigable part of the Thames from Oxford to Yantlet. It has appeared desirable to your Committee to effect such a combination by placing the whole said part of the river under the management of the present Board of Thames Conservancy, if that Board were willing to take it on fair terms."

2396. That was in 1865?—Yes. Then they go on with reference to the locks, and with reference to the landowners and tenants having erected objectionable embankments, saying that the works are dilapidated, dangerous, and so on, and then they sum up with this recommendation: 1. That the maintenance and improvement of the upper navigation of the River Thames is important, and that all practical steps should be taken to render it self-supporting. 2. That the management of the upper and lower Thames should be placed under the same management. 3. That this management should be in the hands of the Conservancy of the River Thames, with such addition to their number as a due regard to a proper representation of local interests of the upper navigation may require. 4. No tolls or charges be levied on the upper navigation which are not applied to its support. 5. That all existing works, rights, and charges, injuriously affecting the upper navigation, should be put an end to on such terms as to compensation as Parliament may determine. 6. Separate accounts to be kept in respect to the upper and lower navigation, and power given to make the revenue arising from the lower navigation a collateral security for moneys raised for the purposes of the upper navigation. 7. That all fishing rights be so exercised as not to interfere with the navigation of the river. 8. That powers be given to raise the money necessary for the above purposes, such money to be a first charge on the revenues of the upper navigation; such powers being given for compounding with the existing bondholders as Parliament may determine. 9. That a Bill be introduced by the Board of Trade to give effect to the above recommendations." Then we come to the Act of 1866, an important Act, which is based, in a great measure, upon that recommendation. The Act of 1866, as the Committee are aware, added five more members to the 18; our Board is, therefore, now 23 in number.

2397. For the information of the Committee, will you kindly tell them how those 23 members are appointed, and of what they consist?—They consist, in the first place, of the 18 original members.

2398. Will

*Chairman*—continued.

2398. Will you state what those 18 original members were?—The 18 original members consisted of the Lord Mayor, two aldermen, and four common councilmen.

*Mr. Cartwright.*

2399. For what period are the aldermen and common councilmen elected?—For a period of five years.

*Chairman.*

2400. I am now speaking of 1857. Were there four then?—They have always been the same. The Lord Mayor and six others. Then there are two members appointed by the Admiralty for five years, and then there are two now appointed by the Board of Trade, one of whom was added by the Act of 1866. Originally it was only one. He is a gentleman from the upper district, Sir Roger Palmer.

*Mr. Cartwright.*

2401. He was appointed by the Board of Trade?—Yes.

*Mr. Hall.*

2402. Was that for five years also?—Yes.

*Mr. Cartwright.*

2403. And appointed as belonging to the upper district?—I do not know that the Act specifies specially that he shall be one of the upper district, but it so happens that he is one.

*Chairman.*

2404. That will be one appointed by the Board of Trade. We are taking first the 18?—Then the Trinity House members are appointed in this way. The deputy master is an *ex officio* member, and one of the Elder Brethren is elected annually by the Elder Brethren.

*Sir Trevor Lawrence.*

2405. Are the two from the Board of Trade appointed for five years?—Yes.

*Mr. Hall.*

2406. And the two Trinity House members for five years?—No, it is a little complicated. According to their charter, the Elder Brethren are elected each year themselves, so that they are really annual members, strictly speaking. Then the deputy master is *ex officio* a member. He might not be re-elected Deputy Master, and he would then cease to be a member of our Board. You have got 12, I think, now. Then the Act of 1864 added six.

*Chairman.*

2407. Now that we have the 12 members, will you kindly tell us how you make them up to 18?—There were six added in 1864.

2408. How were they appointed?—Two are elected by the shipowners. Their constituency amounts in number to 770; and at the last election we had rather a sharp contest. The passenger steamers elect one. He is elected by the owners of steamers plying this side of Gravesend. When that Act was passed there were several companies, and the constituency was rather larger than it is now. The London Steamboat Company have purchased nearly all the steamers, and the constituency has dwindled down to six, and the votes are only 17, ten of those votes belonging to the London Steamboat Company, that being

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*Chairman*—continued.

the maximum allowed to anybody. Then we have owners of lighters and steam tugs, who elect two members; their constituency amounts in number to 916. The dock owners and wharfingers send us one member, and their votes are about 136; that was at the last election. That makes the six members, which brings us up to 18.

*Mr. Hall.*

2409. You said, with regard to the constituency numbering 916 of the owners of lighters and steamers, that you did not count the number of votes; what did you mean by that?—I have not brought all those details, but I will illustrate it in this way, with regard to the shipowners: for instance, a man has so many votes for so many tons of shipping, but no one is to have more than a certain number of votes; I think 10 is the maximum; so that although I give you the number of voters, the actual number of votes will be a great deal more.

*Mr. Cartwright.*

2410. I do not quite understand that; you say the number of votes will be a great deal more?—Yes; because you see many are entitled to more votes than one. The shipowners especially are entitled to many votes. I think it is a vote for 40 tons; so that a man may have several votes, but he cannot have more than 10.

*Mr. Hall.*

2411. Then could this constituency of 916, by any possibility, represent 9,000 votes?—Of the shipowners, certainly; but I have not looked up that particular point very specially.

*Chairman.*

2412. You can look at it afterwards, if you please. We now have the 18 conservators; and now we come to 1866; will you kindly tell us the alteration then?—I can give you an answer to the last question, if you like, at once; at last election 4,269 votes for the barge-owners; the voters were 916.

*Mr. Cartwright.*

2413. The lighters and tugs?—Yes; “barges” is, perhaps, the simpler term.

*Chairman.*

2414. We now have 18; will you kindly tell us as regards the other five?—The other five were added to our Board by the Act of 1866. I think Mr. Rawlinson has told you there was a difficulty in finding a constituency for four of these gentlemen; one is appointed by the Board of Trade, but the four others are elected. It is such a curious constituency that, perhaps, the Committee would like to hear what it is; it is, in fact, the old Commissioners who are made into a constituency for electing these four members; the Commissioners who had charge of the river were converted into a constituency.

2415. Can you tell the date of the Act under which those old Commissioners acted?—There are a great many Acts; some of them are unrepealed now.

2416. Several old Acts?—Yes.

2417. However, we have now got five more; and the present constitution of the Board, I think, will be in this wise: seven nominated by the Corporation of London, two by the Trinity House, two by the Admiralty, two by the Board of Trade,

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Admiral Sir  
F. Nicolson,  
Bart., C.B.  
22 June  
1877.



Admiral Sir  
F. Nicolson,  
Bart., C.B.

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1877.

*Chairman—continued.*

two by the shipowners, one representing the steamers, two representing the lighters, one the wharfingers, and four elected by the old Commissioners?—Yes; that makes up 23.

2418. That is the present constitution of the Board of Conservancy?—Yes; then I have here a list of the persons who form the constituency for the election of those four, and they number about 1,193, and the voters are the same; perhaps you would like me to put this in: "Members of Parliament for Wilts, Gloucester, Oxford, Berks, and Bucks, and for all the cities and towns in these counties. Members of Parliament for University of Oxford, and for Middlesex and Surrey, London, Westminster and Southwark; Lord Mayor and Aldermen of London, Vice Chancellor and heads of colleges and halls, University of Oxford; Deans and Canons of Christchurch, and of Windsor, Provost and Fellows of Eton College, Rectors and Incumbents of the parishes bordering on the Thames and Isis from Staines to Cricklade; Mayors and Records of Oxford, Abingdon, Wallingford, Reading, Henley, Maidenhead, and Windsor, also Senior Bridgewardens of Great Marlow, and the clerk of Her Majesty's Board of Works, residing at Windsor Castle. Every person seised in his own right or of his wife of lands, tenements, hereditaments, freehold or copyhold, worth 100*l.* a year, in Wilts, Gloucester, Oxford, Berks, Bucks, or being heir apparent of some person having such estate of clear yearly value of 200*l.*, and every person who does or shall reside in either of the said counties being seised, &c. to the value of 100*l.*, a year in Great Britain, or being heir apparent of some person having such estate of yearly value of 200*l.*, or possessed of personal estate value 3,000*l.*, or holder of navigation bonds value 500*l.*"

2419. Those are all the electors?—Those are all electors.

*Sir Trevor Lawrence.*

2420. Then did an election take place after that Act?—Yes; one goes out by rotation.

2421. Every year?—Every year. Wherever there is more than one elected member they take it in rotation, so that for the four added in 1866, it would take four years to come round to any one's turn.

2422. But there is an election every year?—Yes.

2423. I appear to have a vote, but I was never aware of it; that is why I asked the question?—That is very possible.

*Chairman.*

2424 I observe that there have been seven members of the Corporation since 1857?—Yes, they have never been altered.

2425. One committee, I think in 1863, reported that they thought that the members of the Corporation were sufficient, but that recommendation has not been acted upon?—No, never.

2426. The fact is the Corporation handed over the jurisdiction to the Board of Conservancy?—It was a compact between the Crown and the Corporation; there had been a long litigation, and to finish that litigation our Board was established under an agreement which you will find in the beginning of our Acts. I should like to add, because I do not think the members of the Committee quite understand it, that in all these elected members, if there is only one member, the representative, for instance, of the steamers,

*Chairman—continued.*

he is re-elected every year; if there are two members, or if there are four members one goes out by rotation annually.

2427. So that there is a change of members?—Well, they are eligible for re-election.

2428. But they go out, and are re-elected?—It is quite competent to the constituency of the upper navigation to send in a fresh member every year.

2429. How often does your Board meet?—We have a Board meeting once a week, every Monday, and we have a sort of what I may call a permanent committee every Friday; we have other committees when they are wanted, a Finance committee once a month, and other committees, the Upper Navigation committee, the Law and Parliamentary committee, and so on, when they are required.

2430. While we are on the question of the constitution of your Board, supposing that extra powers be given to the Board for the prevention of the floods, for which this Committee is appointed, thereby affecting riparian owners and towns on the bank of the Thames, would it be unreasonable that the landowners and local authorities should be represented on the Board?—I presume you mean by extra powers, extra money.

2431. Of course if you have extra powers you will require rating powers as well?—Quite so. Our view is, that we have already these four representative members from the upper district; and we are, I will not use so strong a term as unwilling, but we are not desirous that the constitution of the Board should be altered, as we think we have done our own work fairly well, considering the small amount of means we have had for that upper district. But, at the same time, if it becomes an absolute necessity to introduce the difficult question of rating, I presume that some few members might have to be added; but you see these questions are so mixed up together, that they are very difficult to deal with. Some persons are ready to say that there are other sources from which the money might easily be derived, avoiding the rather complex question of rating, and giving us the powers that you speak of.

2432. Supposing that it be so difficult to decide as to the property that should be rated, what other means would you suggest of raising funds for the purpose of carrying out the works which you consider needful?—I know of no better means of providing our Board with funds than following the advice given by Mr. Rawlinson, of largely or considerably increasing the contributions of the water companies; and, incidentally, I may also mention, that the pleasure boat tariff ought to be revised; but from that source I do not think we could anticipate a very large increase of revenue. As you have asked me that question, I hope you will allow me to read an extract or two from the evidence of Mr. Simpson, the engineer to the water companies, given before the Select Committee of 1865. He is not alive now, or no doubt he would have been here as a witness. He gives evidence that the works equalised the flow of water; by the water passing over the weirs, it gets improved by being oxygenated; and, he says, the maintenance of the navigation is a benefit to the large water companies of London. That is from the Report of the Committee of that year. Then I should also like upon this point to clear up the idea which

has

*Chairman*—continued.

has been in your mind with reference to the amount paid by the water companies.

2433. Will you kindly give us information upon that point?—In 1852 the water companies came to an agreement with the then Navigation Committee of the Corporation of London to make certain payments. Now, the amounts which I am going to read are payments made in respect of the works between Staines and Teddington. They have nothing whatever to do with the upper part of the river. These payments are 300 *l.* from each of the water companies: the Chelsea, the West Middlesex, the Grand Junction, the Southwark and Vauxhall, and from the Lambeth only 200 *l.* I do not remember why, but since then Lambeth has paid 50 *l.* more, bringing up the total to 1,450 *l.* I think they got another outlet in 1871, and they paid us 50 *l.* more. What I want to explain is that 1,450 *l.* is paid to the lower fund, and has nothing whatever to do with the upper fund.

2434. For works between Staines and Teddington?—Yes, they are paid under an agreement; the Conservators spent a good deal of money in works there, and it was thought fair that the waterworks companies, who were to benefit by them, should contribute.

2435. Making 1,453 *l.*?—Yes, which belongs to the lower fund. You will remember, below Staines. Now we have the Act of 1866, by which the same water companies pay 1,000 *l.* each, making 5,000 *l.* Since then the East London Water Company, in 1867, paid us 1,000 *l.* more; and again, in 1876, they have paid 500 *l.* more, making a total of 6,500 *l.*; to that you must add 50 *l.* paid by the West Surrey Water Company in 1869, making the total 6,550 *l.* That was a small waterworks company. Following out the former principle, we considered that they should pay that to the upper fund, which is one of the good deeds we have done towards that fund.

2436. I will just go through that again, if you please. In addition to the 1,450 *l.* in 1852, you have had 5,000 *l.* from each of the five companies as above, and 1,500 *l.* from the East London, and 50 *l.* from the West Surrey Company?—Making a total of 6,550 *l.*

*Mr. Cartwright.*

2437. And the 50 *l.* from the West Surrey you allotted to the upper district?—There was nothing to prevent us; the water was taken from the upper district. There was a little doubt at one time as to what fund it should go to, but we thought it was only right to follow the Act of 1866, and apply it to the upper district. Then, besides that, the East London in 1881 will pay us 500 *l.* more, and that completes the payment.

*Chairman.*

2438. And your total receipts are now 8,000 *l.* a year?—Yes, but you must not mix them, please, because our two funds are kept entirely distinct, and if you say 8,000 *l.* a year, it may confuse, and lead to the supposition that it is all paid to the upper fund.

2439. We are considering now the question of what they pay, and what more you wish to extract from these companies, therefore we are bound to see what all these companies are paying, in order to see whether they ought not to pay more?—Quite so.

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*Mr. Cartwright.*

2440. Do I understand you that of these 8,000 *l.* all except 50 *l.* are allotted to the upper river?—No. 6,550 *l.* is allotted to the upper river; 1,450 *l.* is allotted to the lower river, by an old agreement made long before our Board was established.

*Chairman.*

2441. At present you get 8,000 *l.* a year, and in 1881, supposing no alteration takes place, you will receive 8,500 *l.* from these seven companies, including the little company, the West Surrey Company. Now will you kindly explain to the Committee why you hope that the water companies will increase their contribution over and above that 8,500 *l.*?—I hope that Parliament will see it wise to cause them to make an addition upon that, as the original contribution, as settled by the Act of 1866, was, in the view of a competent witness like Mr. Rawlinson, a very small one.

2442. It is true that Mr. Rawlinson is a very able man, and was able fully to express his views before the Committee of 1866, but the Committee of 1866 decided upon this present arrangement?—Quite so.

2443. Have any new facts come to light, or have you any new arguments to prove that the Committee of 1866 were in error in coming to that determination, because Mr. Rawlinson has not been successful here in telling us why the water companies should give a further contribution?—My first argument is based upon the evidence of Mr. Simpson, their own engineer, but I should like to impress upon the Committee that the two Committees of 1865 and 1866 received very strong evidence indeed that as soon as the river was put into fair order, which we maintain it certainly is now, from Oxford downwards, as a navigation, that there would be a large increase of traffic. The whole of the financial arrangements of the Bill of 1866, if I may so call them, were based upon the assumption that we should very soon receive a large revenue from the barge traffic. Now instead of that being the case, I am sorry to say that the barge traffic has been sadly diminished. That is one position which I think I may take up as a reason why in all probability the Committee of 1866 fixed the sums to be paid by the water companies at such a low amount, if you consider the enormous amount of water they take from the Thames and distribute to the water drinkers of London.

2444. By abstracting this water, is there any possibility of their interfering with or injuring the navigation?—As yet that limit has not been reached, and the water companies, as you are no doubt aware, are limited by their Acts to a certain amount, beyond which they are not to take the water.

2445. That amount does not form a third of the flow of the river in the dry season?—It is about a third of the summer flow.

2446. Not a third in the very driest season?—It is about that.

2447. I think you will find that the lowest quantity is 350,000,000 gallons daily, after the companies have abstracted 50,000,000 gallons. Therefore, you may suppose that it is 400,000,000 gallons of flow, and I think also the companies are entitled to take 110,000,000 of gallons?—I think it is about that.

2448. Therefore, it is a little over a quarter of

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of the flow of the river?—Yes, it is not far from it.

2449. Therefore, there does not appear to be any fear of your navigation being injured by the abstraction of the water?—I trust not.

2450. Do you feel that it is a just claim upon the companies to give a greater contribution to you because your tolls have fallen off?—I do not quite put it in that way; the way in which I wish to put it is this: that if the Committee of 1866 had known that their anticipation of a large increase of barge traffic was not likely to take place, they must have found us larger funds, either from the water companies or from some other quarter, because we wrote most strongly to the President of the Board of Trade, Mr. Milner Gibson, who was the Chairman of that Committee, to this effect: "We have to express our great reluctance to undertake the extensive duties and liabilities proposed to be imposed upon us," that is, the Conservators, "by this Bill, unless some provision is made for supplying the funds by which these duties and liabilities are to be discharged."

2451. Supposing your funds were not ample, you say that you consider there are two other means of increasing the revenue, one by increased contribution of the water companies, and the other by taxing pleasure boats?—By altering the tariff. Of course I do not mean to disguise the fact that there is the other alternative of rating powers.

2452. But rather than have those rating powers you first look to these sources; have you any other reason to adduce why the companies should increase their contributions?—Except that as the works on the navigation are brought into the state in which I hope they will be very shortly, you have it from their own engineer that weirs, and so on, rather improve the river; larger funds given to us would enable us to dredge, to look perhaps more closely after the weeds, although I think there has been a little exaggeration as to the damage the weeds do; and, in short, generally to improve the river throughout. Then, I do not want to touch upon the sewage question; but although, of course, we do not pay for the works to keep it out, yet we do pay, I will not say a large sum, but we pay in taking a great deal of trouble in having to work them up, and also in law expenses.

2453. I think you give notice in any case that is brought to your knowledge, of a bad drain flowing into the river, to the parties to take immediate steps to prevent its doing so?—We have done so hitherto.

2454. And if a dead horse floats down the river?—Then we bury it, if we can get it out.

*Sir Trevor Lawrence.*

2455. Do the companies take materially more water now than they did when that Act was passed?—I suppose, as the population of London increases, that they do so.

2456. You do not allege that as a reason for charging them more, because they take more?—If you come to the question of charging them *pro rata*, I certainly think, if this Committee are prepared to recommend the principle that water taken from the river is to be paid for at so much a gallon, we shall be only too delighted; but, of course, as the population increases they must take more water.

*Chairman.*

2457. At present they are entitled to take 110,000,000 gallons daily, and they take under 60,000,000?—I thought it was rather more than that.

2458. We will say about 60,000,000?—In any future arrangement it would be very desirable for the companies to have counters on their pumping engines.

2459. They all have, I believe?—I am not sure that they all have.

2460. However receiving as you do or will in 1881, 8,500*l.* a year; do you consider that that is not sufficient compensation to you for the trouble you take in keeping pollutions out of the river and other little matters, such as the dead cats, and so on?—I would not quite put it as compensation for our trouble, of course our trouble is not equal to that, but I think if you take a large view of the question you will see how desirable it is that the Thames should be in all respects a pure river, with the works all in proper order; I think that it is a very fair way of getting out of what is really in some respects a difficulty.

2461. You think at all event that the present arrangement is advantageous to the companies, to the conservancy, and to the public generally?—I think so.

2462. But that you, as a conservator, would like to see these contributions increased?—Yes, because I presume that the extra 5,000*l.* a year, would probably be spread over the whole of the water consumers of the metropolis.

2463. I am afraid that your financial condition is not very flourishing?—Not in the upper navigation. I should like to direct the attention of the Committee to two documents which I have before me, our annual accounts laid before Parliament. By a peculiar arrangement in our Act of 1857, we cannot present these until a certain formality, the annual meeting, has taken place, which cannot take place until June. You will, however, shortly have before Parliament the two accounts which I have got here with the annual report of our proceedings. While I am upon this point, I wish to correct an impression which seems to have arisen in the mind of Mr. Hawkins, when he gave his evidence, that we, in consequence of some things the Thames Valley Drainage Commissioners had asked us for, had altered the form of our annual account; it is quite a mistake; the supplemental report, which you know so well, which we presented to Parliament a short time ago, was in a different form, for this reason, we wished to state as briefly as possible the whole money we had spent, and the account was brought up to the end of the year 1876, in order that Parliament might have the latest information which it was in our power to give; but our annual reports will continue to be presented as they have been, in the same form exactly.

2464. You have made no alteration in the mode of keeping your accounts?—None whatever. It is quite a mistake. I have here the account of the upper navigation, which chiefly concerns the inquiry before this Committee, and it is not quite satisfactory, for we have been obliged to borrow considerable sums of money. I do not know how you would wish me to put it before the Committee, but perhaps if I give the tolls, which amount to about 4,000*l.*, and the contribution of the water companies, 6,550*l.*, that brings our ordinary

*Chairman—continued.*

ordinary revenue to 10,600 *l.* a-year for the upper river. Then, in the year ending December 1876, we have an expenditure on revenue account of 9,363 *l.*, and on capital account, 5,033 *l.*, making a total of 14,396 *l.*

2465. How did you raise that 5,000 *l.*?—Well, we go on borrowing, I am sorry to say; there is no other way of raising it. I will now come to the capital account. What we have borrowed has been 40,000 *l.* from the Public Works Loan Commissioners.

2466. You are only speaking of the upper Thames?—Entirely of the upper Thames, above Staines. We have borrowed, from time to time, in various sums, 40,000 *l.*, of that we have repaid about 6,300 *l.*

2467. Then you owe now 34,000 *l.*—To the Public Works Loan Commissioners, and we owe, I am sorry to say, besides, 8,804 *l.*, advanced from the lower navigation. I should like to explain, with reference to that 8,804 *l.*, that 3,200 *l.* of it was expended in passing the Bill of 1866, and was charged by that Act to the lower fund.

2468. We have heard something of an old debt of 88,000 *l.*, which you inherited under a former Act; what has become of that?—£. 88,400, I think it is; that is postponed.

2469. Do you pay interest upon it?—The old commissioners paid 10 *s.* per cent. in 1863, and since that date there has been no interest whatever paid.

2470. In fact, you wish to forget that loan?—We never, I may say, saw nor had anything to do with it. We did not spend it. The Act of 1866 specifies very clearly in what order we are to make payments. I should like very much to call your attention to that clause, because we have been rather hard hit with reference to it. It is Section 88 of that Act of 1866, and this is the order in which we are to apply our revenue: (1.) "In defraying the necessary and proper establishment, and working expenses of the conservators under this Act, and the expenses of the repair and maintenance of the works vested in or acquired or constructed by them by or under this Act. (2.) In paying the interest from time to time accruing due on any mortgage debt contracted by them." Those will be the loans we have borrowed from the Public Works Loan Commissioners. "(3.) In providing the instalments or sinking fund required by this Act." We have a sinking fund, and as I told you just now, have repaid the Public Works Loan Commissioners 6,300 *l.* Then comes No. 4, and I should like to call the attention of the Committee to that: "In payment of any annual sum payable by way of compensation under this Act, except where otherwise provided by this Act." Now unfortunately a few years ago a gentleman went into the Court of Chancery, and after a certain amount of legal proceedings the Vice-Chancellor decided that the Committee of the House of Commons, in making the payment for compensation number 4, instead of number 1, or number 2, had not done what was equitable; that they could not have intended to postpone those payments, and the result was that we have had to pay 6,000 *l.* for compensation, and 3,000 *l.* odd for legal expenses, bringing up that item to nearly 10,000 *l.*, which would otherwise have been spent upon the works on the upper navigation, and would nearly (I will not say quite

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*Chairman—continued.*

have completed them, because it would not); but would have brought them into a much more satisfactory state than they are now.

2471. Then you do not quite admit the allegation of Colonel Harcourt, that the Board of Conservancy have not done full justice to the upper navigation?—I certainly do not admit it. Not only have we spent a large sum of money in various works there, but we have gone to the very verge of illegality in advancing money from our lower fund rather than see the whole of the river stopped by the giving way of some weir or lock. In addition to the 8,804 *l.* which appears in the accounts up to the 31st of December, we have since advanced 2,000 *l.* from the lower fund, bringing it up to 10,000 *l.* odd; and I am afraid unless we get relief from somebody, we shall have still further to advance money, or else do what eventually we must do, unless we receive more money, stop the whole of the works on the upper navigation. I ought to have stated what has been spent. I only told you what we have borrowed. Would you like me to give you the total of what has been spent from the 6th of August to the 30th of December 1876. The total of expenditure on capital account has been 52,528 *l.*, and if you add to that the revenue account, it brings the grand total up to 153,173 *l.*

2472. Perhaps you will furnish the Committee with those figures?—I will hand them in certainly.

2473. Have you quite done now with the upper fund?—Unless you wish to ask me any questions. Of course, I have not gone into every detail.

2474. But the figures, I presume, will show everything?—Yes. I have, besides, a return to put in; and I think it will come in conveniently now. It is a return which this Committee has asked for, and we have drawn it up to make it intelligible in this way; it gives the answers to a number of queries which were put to us with regard to the works, expenditure, and so on, down to Day's Lock. I will also put in, if you will allow me, an abstract of the receipts and expenditure upon that district; it is a district to which the Thames Valley Drainage Commissioners have alluded so often. The total are, receipts, 11,209 *l.*; expenditure, 25,112 *l.* (*The Witness handed in the Documents referred to.*)

2475. Is this for 1876?—No, this is for ten years. I am giving you an abstract. This return relates to the district from Lechlade down to Day's Lock. I am merely giving you an abstract of all those details, so that without any charge for management, repayment of loans, and so on, we have spent in that particular district 25,112 *l.*, and we have received, 11,202 *l.*

2476. That is in ten years?—Yes.

2477. You are referring to the allegation of Colonel Harcourt, that the Thames Conservancy did not spend sufficient in keeping the upper part of the river in order, considering the revenue derived from it, and in replying to that you stated that in the last ten years you have received by way of revenue from the Upper Thames 11,209 *l.*, and have expended 25,112 *l.*?—Yes. But if you will kindly not call it the "Upper Thames," I think we shall avoid getting into confusion; it is down to Day's Lock.

2478. The district over which the jurisdiction

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of the Drainage Commissioners extends?—Yes, that would perhaps be better. I should now wish to add to that, a statement of the amounts expended on locks and weirs, from Day's Lock down to Staines, the limit of our old jurisdiction; the total amount is 60,279 l., to be added to the previous amount. I wish to say one word, if you will allow me, with regard to the lower navigation fund. Several of the witnesses who have been examined before this Committee have spoken of drawing the line at Teddington Lock, thus confining the Conservancy to the tideway, and drawing the line there. The first difficulty then arising would be to meet the debt of 105,600 l., which was borrowed to execute the works between Staines and Teddington. I will not go into any farther expenditure of the Board; that will come better hereafter; but I simply wish to point out to you that, although the lower fund is in a satisfactory state, there is a debt of 105,600 l. for the works between Staines and Teddington. I have here a return of the barge traffic and pleasure traffic. I do not know whether you would like to have it.

2479. Yes, perhaps you will kindly put in all the returns that you wish?—The barge traffic amounts, on the average, to 2,330 l. and the pleasure traffic, 1,499 l. (*The Witness handed in the Return referred to.*)

2480. The pleasure traffic is rather increasing, and the barge traffic, if anything, is going back?—Yes.

2481. You alluded to the Thames Valley Commissioners; their view seems to be somewhat different from that entertained by yourself, and I am afraid that your relations have not been of the most harmonious nature?—I wish very much to say some words upon that.

2482. Some correspondence has passed between you?—Yes; it was not until I came into this committee-room that I had the least idea that there was the slightest ill feeling, or had been any conflict, or any hostility whatever, between these two boards. It was a matter of surprise to all of us to hear that that was the case. We had no communication from that body until the 12th January 1877, they having been established in 1871. The letter we then got asked us for the information which I have just handed to you, elaborate returns with regard, not to any work in the river proposed to be done by them, or anything of that kind, but simply details of the whole of our expenditure extending over 11 years, the Thames Valley Drainage Commissioners having only been in existence six years. We felt that nobody had a right to ask us for all those details, except a body in authority over us, such as the Board of Trade, or a Committee of the House of Commons. We therefore referred the Thames Valley Drainage Commissioners to the returns we annually send to Parliament. I know a great deal has been made of our referring them in that manner to those accounts, but I think no board with any self-respect could allow a question of that kind to be asked, which really became a criticism of the whole of our administration of that part of the river for 11 years. You have the information now, and it will be for the Committee to judge as to that point. But, if you will allow me, I will read the only other communication we had. I wish to impress this upon the Committee that we have only had two communications from them, and here is the other

Chairman—continued.

communication:—"Office of the Thames Valley Drainage Commissioners, Town Hall, Oxford, 21st February 1877. Sir,—The Commissioners yesterday had a conference with Sir John Hawkshaw with a view to ascertaining if they could arrange with him to advise them on the arterial drainage of the valleys under their jurisdiction. It was stated that the conservators had sections and cross-sections of the whole of the River Thames from Lechlade downwards. I am directed to ask you whether your Board possesses such sections of the whole or any part of that length of river, and whether they would be willing to allow Sir John Hawkshaw or anyone on the part of the Commissioners to have access to them, and under any, and if any, what conditions. I am, your obedient servant, Robert S. Hawkins." That was their request, dated not very long after the former one, and here is our answer. "1st March 1877. Sir,—In reply to your letter of the 21st ultimo, I am directed by the conservators of the River Thames to inform you that they have given instructions to their engineer to afford the Thames Valley Drainage Commissioners all the information on the subject of the River Thames, which it is in his power to supply. I am, Sir, your obedient servant, E. Burstal, Secretary." Those are the only two communications we have had with the Thames Valley Drainage Commissioners, and I do not think in the last communication there is anything but a desire to afford them all the information possible on our parts, because it is most important to us, as managers of that part of the river, that their works should commence as soon as possible. Mr. Leach has already explained to you that the delays on their part have been an inconvenience to us, in obliging us to postpone works which might perhaps have been undertaken upon that part of the river.

2483. It is not for us now to state which of the two bodies is in fault, but the Committee are alive to the fact that the Thames Conservancy and the Thames Valley Drainage Commissioners are not acting entirely in harmony with each other, and we should like to know your opinion as regards the future administration of the river and what suggestions you have to make upon that point?—I do not quite like to admit, in fact, I cannot admit, that we are not acting in harmony, because there has been as yet no action whatever. The only thing has been that two letters have passed, the last of which expresses an anxious desire to afford them all information. I do not admit that there is anything like what has been stated as to what is called the joint jurisdiction. The Thames Valley Drainage Commissioners are entitled to do works in the river subject to our approval. The curious thing about this point is that in the upper district there is a reference to the Board of Trade, supposing we unreasonably refuse them any works, or decline to do them ourselves, for we may do them ourselves if we are so minded, they paying the expense. With regard to the whole of the works on the river, from one end of it to the other, it is part of our daily business to consider applications for works to be done in the river, and it is entirely in our power to refuse or to allow such works, without any reference whatever to anybody, either the Board of Trade or to anyone else. We have those large powers given to us, under, of course, the supervision of Parliament, to whom we report annually, and, of course, persons aggrieved



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aggrieved have their remedy, I presume, by process of law. But it is rather peculiar that in the Act of 1866 was first introduced that reference to the Board of Trade in the district above Oxford, that should any difficulty arise between the Conservators and the Drainage Commissioners, although these special Drainage Commissioners were not then in existence, there should be a reference to the Board of Trade.

2484. The Drainage Commissioners were appointed in 1871, I think?—Their Act was passed then, but it was simply an extension of the previous section in our Act of 1866.

2485. Suppose this new labour of mitigating or abating the floods in the river be imposed on the Thames Conservancy, and the Committee think it possible that it would be advisable to make some alterations in the constitution of your Board, I wish to ask you upon two or three points as regards that; at present you have seven members of the Corporation of London on the Board, will it be necessary for the performance of the objects you have in view, the navigation, the exclusion of pollution, the mitigation of floods, and so on, that the Corporation of London should be represented by seven members; perhaps the question is rather difficult to answer?—I only want to make this observation, that I cannot quite allow that the mitigation of floods is a new duty. Although we may not have been enabled, by the means at our disposal, to do all that we could wish with regard to larger tumbling bays and dredging; and although our powers do not allow us to alter bridges, as has been suggested, and so on; still the mitigation of floods is a question we have always had in view, in all the new works that have been done on the upper part of the river. When you ask me with regard to the constitution of the board, and making an alteration in it, of course it is rather a difficult and delicate question to answer. With regard to the Corporation, I am quite willing to say at once, that I am sure the Corporation members would tell you that they look upon it as a contract between the Crown and themselves, and that the Act of 1857 was a compromise, to a certain extent, that they were then seven out of a board of 12, and being now seven out of a board of 23, I know they would most strongly object to any diminution in their number.

2486. Notwithstanding the recommendation of a former committee, that their number should be reduced to three?—Yes, which the committee following could not or did not, carry out.

2487. As regards the Trinity House, they had two members?—Yes.

2488. Is that essential for the due constitution of your board?—I think it is most important that those members should be retained. They are nearly always gentlemen who have been long engaged in matters connected with either the Royal Navy or the merchant navy; chiefly the merchant navy; it so happens that an Admiral is the present deputy-master, but as a rule they are gentlemen having a large acquaintance with shipping affairs, and it is most important that they should be retained.

2489. Then, as regards the Admiralty, they return two members?—As I am one of them you can hardly expect me to say anything against that. In answer to that I should like to remind you of what I read from the Report of the First Select Committee: "Imperial interests of much

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importance are concerned, for which it is expedient specially to provide; with this object it seems right that the Admiralty and Board of Trade should continue to nominate members of the Board."

2490. Just so, but I am going through this in order to consider whether the number of the present members could be reduced, looking to the possibility of others being added, and therefore the possibility of bringing up the Board to too large a number, and making it a cumbrous Board; the Board of Trade have at present two members?—Yes.

2491. The question has been raised whether one of those should be returned by the Board of Trade and another by the Inclosure Commissioners?—I trust that, whatever may be done, there may be no other supervising authority introduced. I think that would be most undesirable, so far as my experience goes. The Board of Trade and our Board have worked harmoniously together since 1857, and I think it would be most undesirable to introduce a body like the Enclosure Commissioners, who have no representative in Parliament, whereas the President of the Board of Trade is always in Parliament, which is most important, and the permanent officials there know the whole of our affairs so thoroughly that I should be very sorry indeed to see the Inclosure Commissioners appointing a member of our Board.

2492. As regards the two representatives elected by shipowners, one by the steamers, two by lighters, and one by the wharfingers; what do you say?—It is almost impossible for me to separate in my answers to these questions, the abstract representative in my mind from the gentlemen who now represent these particular bodies. I must state, however, though I do so, I am sure, with reluctance, because the gentleman to whom I allude, is extremely useful on our Board, that the passenger steamers are now reduced to the representation of one large steamboat company, which pays us a considerable sum, you know, for using our piers, not as a contribution; they used to pay us so much per call, but, by mutual arrangement, we have agreed that they should pay us 8,000*l.* a year, and they pay us that. At the same time one cannot overlook the fact that the constituency has become a very small one, although I do not know any member who has been so useful on the Board, in many respects, as the gentleman who represents that interest, especially with regard to his own company.

2493. Especially as you derive revenue from these steamers, and make piers for the accommodation of the steamers?—I cannot quite admit that it is revenue. We have spent a large sum of money in placing piers for the accommodation of the public. We are entitled to make, not this company in particular, but any one who calls at those piers, pay per call, or we may arrange, for mutual convenience, that they should pay a fixed sum. It so happens that it has now become a large monopoly, they having bought up the other companies; but I do not look upon this as revenue; and, so far from that, we have fixed it at that sum, which pays the working expenses, and barely pays a little more in per-centage on capital, but nothing for the replacement of capital or for wear and tear. There is a little excess above the common working expenses, the wages

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of the pier-men, the pier-masters, and so on, which amounts to a very large sum.

2494. Then you do not think it advisable, in a financial point of view, to increase the piers, to meet, perhaps, the increasing wants of the public?—No; I will put it in this way. We constantly have applications for new piers, and we have now one under consideration. Of course, if we put up another pier, we should ask the steamboats to pay so much more for calling at that particular pier, to cover the working expenses.

*Sir Trevor Lawrence.*

2495. Do all these piers belong to you?—Nearly all, not quite all.

2496. These new piers?—Nearly all; there are a few here and there; for instance, the one at Charing Cross does not belong to us.

2497. I only wanted to know, speaking generally, whether they belong to you or not?—Nearly all. If there is one to be sold at a reasonable rate we do our best to get it, because we think it is better that they should be all under one management, which we think is a very efficient management.

*Chairman.*

2498. Now we come to the four members elected by the old commissioners. Supposing that you fail in getting any increase of revenue from your tariff on pleasure-boats, suppose you are not successful in getting any great amount of extra contribution from the water companies, you would have to fall back upon the rating?—Unless this Committee can suggest any better means of providing us with the necessary funds for finishing the work, I know of no other sources.

2499. Therefore, we are reduced, I think, to that alternative. Now, suppose you have rating powers granted, the parties paying those rates will naturally expect to be represented according to the present system of things?—I suppose they will expect it.

2500. At present you have four representative Conservators who may be supposed to represent landowners?—I should like to put it in this way. We have four gentlemen elected by constituencies which, not entirely, but generally speaking, belong to the upper part of the river; but there is one remark, if you will allow me to make it, that we consider ourselves conservators of the whole river; with all submission to my friend Colonel Harcourt, he has given the Committee an erroneous impression in that respect; he was on our board only during the first year of our getting this district; we were naturally rather frightened at the immense duties before us, considering the ruinous and bankrupt state of the whole affair, and I think it is quite possible that at first we did not go quite as fast as Colonel Harcourt wished. At the same time, if Colonel Harcourt had assisted us more by attending our board; if, instead of attending about eight times out of 45, and attending the committees, I think, somewhere about nine times out of 25; if, instead of only attending 17 meetings in all, he had had a little more patience, and stayed longer, I am sure it would have been a great benefit in every way, from his influence and his ability. But to come back to the question you asked me, what I was trying to impress upon the Committee was, that there are many of

*Chairman*—continued.

us whom, it is rather the fashion to treat in these rooms as gentlemen who belong to the tideway, who know a great deal more of the whole extent of the river than any of these local gentlemen who only know their own small piece of the river, and that we all consider ourselves to be Conservators of the whole river. The gentlemen representing all the various interests, apart from these four, take as much trouble, give as much consideration, and visit that part of the river as often as any of those four gentlemen. So far as I have had experience of the Board, we have worked very harmoniously together; the only difficulty with regard to that upper district has been, from first to last, the want of adequate funds to do what we all wished to do.

2501. You stated that Colonel Harcourt considered you had not been quite quick enough in your operations. One witness has told us that he considers the Drainage Commissioners have employed all their time in making a survey of their district, whereas they might whilst that was going on, have carried out works for the arterial drainage. Are you of opinion that they have lost time in that respect?—Of course I do not know all the details that have caused the delay, but the fact is patent to anybody that they have been six years in getting surveys, which I should think they might have got in a year. As a matter of fact, except one or two very small works which I never heard of until I came into this Committee-room, one of which is up the Cherwell at a place called Islip, there is not a single piece of work done in any part of their district that I am aware of, after their having been six years in existence.

2502. We have had many proposals before this Committee. One was that the Drainage Commissioners should supersede the Thames Conservancy; another was that the Thames Conservancy should absorb the Thames Drainage Commissioners; another that the river should be divided into three districts with three authorities; and other suggestions have been made that the whole river should be under one authority with sub-committees acting locally; I should like to have your opinion upon those different suggestions?—My opinion is quite decided upon the whole of the river being under one authority. There is no difficulty whatever, in the present state of communication, which is very easy, in one authority managing the whole of the river. That opinion was the opinion of the Committee of 1865, upon that district, and it was the opinion of the Committee of 1866, when they passed the Act which is now our Act of 1868. Will you allow me to read a paragraph or two from the evidence of Mr. Beardmore, who, unfortunately, died some years ago; he was the engineer and manager, I may say, of the River Lee.

2503. And he was a very able man?—Most able. I should like just to read you one or two of his observations, because if he had been alive we should certainly have asked you to examine him as a witness. Here is one question: "And particularly with reference to the question of the management of the river above Oxford, are you of opinion that it would be very undesirable to constitute any new conflicting authority in that part? (A.) The inconvenience of conflicting authorities is this: that each drainage district will do the best it can for itself; but I think they

*Chairman—continued.*

they would not find it to be their interest to do anything to the main river itself; you must have one authority for your arterial drainage; that would be the judgment I should form; if it should be the judgment of Parliament to put the whole country, the whole valley, and the whole marsh above Oxford into one great drainage district, I can understand that there will be only the public in that respect, but having reference to the objects of keeping the river a pure river, and having a proper control, I say, as a matter of conservancy generally, the thing may be done with advantage to any of the drainage districts on either side of the Thames. (Sir G. Bowyer.) Do you think that the operations of the Conservators do not interfere with the drainage? (A.) No; we have the same thing precisely on the Thames under the present Conservators (that is ourselves). I have some 15,000 acres which I am engineer to below London, where the marshes and the banks are under the Commissioners of Sewers, but we drain into the Thames, and the two bodies do not interfere. (Q.) Have you not known instances where the powers of the Conservators have, in point of fact, very much impeded the formation of drainage districts, and the working of such districts? (A.) No, I know of none. (Q.) Do you think the authorities, whoever they may be, who manage the river, would interfere with the formation of drainage districts? (A.) I take it that an independent board, liable to the control of the public, with a public revenue, making returns to Parliament of their proceedings, would act like sensible men, and in that respect I should apprehend that nothing of the kind could happen; I can conceive of nothing of the kind; but if they have no funds," he is speaking of us in that respect, "but if they have no funds and the weirs belong to one party and the river to another, and the banks to a third, there is a difficulty, and always must be." That was before the Act of 1866. I do not know that I need read you more.

2504. We have your opinion, and we have Mr. Beardmore's opinion upon that point, and I would only ask you further, whether you see any difficulty in your board; for instance, supposing it had the whole jurisdiction of the river, undertaking the arterial drainage?—By "arterial drainage," you mean the management of the river proper.

2505. Just so?—None whatever, provided we are supplied with sufficient funds. I might have read you a suggestion of Mr. Rawlinson as to the best tribunal of appeal, the Board of Trade.

2506. There is a difference of opinion there, and I shall be glad to have your opinion upon the matter. Some witnesses have thought the Board of Trade, others, the Local Government Board, and others, the inclosure commissioners?—I think, unless some marvellous change is made in the whole affair, the Board of Trade is an excellent Government Board for us to appeal to.

2507. Suppose that one board undertakes the whole river, would that board be able to undertake the functions at present carried out by the drainage commissioners in the upper valley?—I mean by one board, a board who would carry out everything connected with the main river. I would not, on any account, interfere with the Thames Valley Commissioners; I am perfectly confident that, when once they begin really to

*Chairman—continued.*

come with plans for works to carry out what they wish to carry out, which is the drainage of the lands, there will be no difficulty whatever in the whole thing being carried out between them and us; I have not a doubt about that.

2508. You are disinclined to allow the fact of a conflict of authority?—Yes, because there has never been a conflict. I deny the fact; we have never come into contact. The only peg upon which to hang the idea of a conflict of authority was, our declining to furnish a lot of financial details which had nothing to do with the works on the river. May I read a short paragraph from Mr. Rawlinson's evidence:—"You are clearly of opinion that it would be a pernicious thing now to set up an authority for the part of the river above Oxford, distinct from that which would have the control over the river immediately below Oxford?—(A.) I am satisfied it would; you would have two separate boards, you would have two separate sets of paid officers, and you would have that divided action which is always a disadvantage where a thing can be looked after by one and the same." And I hope you will allow me, in connection with this question, to point out this: that the upper navigation above Staines has had the advantage of the whole of our engineering staff, including our very able and experienced engineer; it has had the advantage of the whole of our staff at Trinity-square, the whole of the secretarial and the accountant's department, without a single sixpence being charged, so that, if you establish distinct boards, they will naturally want their engineers, their surveyors; and their staffs, which at present are furnished by us entirely to the upper fund, and nothing whatever is charged for them.

2509. Supposing you have the entire jurisdiction over the whole river, and that you have rating powers to supply you with funds sufficient to control or abate the floods, that with an addition of members who will represent the rate-payers, and with a defined authority to decide in case of any conflict of authority between you and the Drainage Commissioners, you do not apprehend that there will be any difficulty in carrying out such a scheme?—We hope, in any change of that kind, whatever change is made in our board, that it may be a very small one. A board of 23 is a fairly numerous board, and when you come to make any large additions to a board of that kind, which is an executive board, it becomes very cumbersome. Of course it is impossible for me to say that, if we are to have large and considerable funds, provided by rating, there should not be some additional members, but I trust they may not be very numerous.

2510. I would point out to you that there are different parties who might fairly claim to be represented on such a board; such as large landed proprietors, and the social authorities of towns, like Oxford and Windsor. Can you see any objection to such representatives being added to your board?—I think the proper way to add the representatives would be to have a large constituency, in some mode, and I think that constituency which I have before alluded to, though peculiar of its kind, is fairly large; but I think that if any great change is to be made, or if any addition is to be made, the proper way would be to have a large constituency, I presume, of rate-payers, and let them elect a few members. Take our four, for instance; let them elect those four, and

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and then I think you would have a very good representation.

2511. Suppose the University of Oxford were willing to contribute funds for relieving that part of floods, do you think it would be reasonable that the University should be represented on your board?—We asked the University to contribute, and the answer we got was, "Get rating powers." We tried to get rating powers and the landowners threw us over, you know; that is the old story.

2512. Of course, I am presuming that you have rating powers given you?—I really think the whole question of the mode in which this addition will be brought to our board, is hardly one that I have sufficiently considered; all I say is, that we think we have done our work fairly well, and if you will leave us alone, and give us money, we shall be very happy, but if you must alter us, let it be as little as possible.

2513. I presume, from what you have said as regards the water companies, who are deeply interested in keeping up the purity of the water in the river, you would be disinclined to have any representatives of the water companies on your board?—That question was argued out in 1866, and the Committee then decided that it was not desirable; but if you give us any rating powers whatever, or if you give us a good round contribution from the water companies, we shall be delighted to have one of them upon our board, but it is with those two provisoes.

2514. If the water companies gave you 20,000 *l.* a year, you would be delighted to have a couple of them on your board, I presume?—Yes, and one for 10,000 *l.* additional.

*Mr. Cartwright.*

2515. In fact, what you really desire is to get an addition to your funds?—We desire it, simply because we are in a helpless condition above Staines.

*Chairman.*

2516. You are aware that in 1867 a new Conservancy was appointed for the River Lea?—Yes, I know there was, but I have not studied that Act very carefully.

2517. And perhaps you are aware that upon that board, which was appointed for the Conservancy of the River Lea, the waters of which are obstructed by two water companies; out of 15 members the New River Company send two members, and the East London Water Company send two members?—I was not aware of that.

2518. Therefore, perhaps you would think it would not be altogether unreasonable if the water companies had some representation on the Conservancy Board of the Thames?—I think it ought to depend entirely upon whether they gave us any increased contribution.

2519. It is a case of money?—Yes.

2520. Then, as regards the mills, we have heard a great deal of them, and of their increasing or having a tendency to increase the floods at times?—Yes; I wish very much to explain that clearly, because I do not think it has yet come out quite clearly in evidence. The whole of the weirs in the upper part of the river, were transferred entirely to us. Certain rights existed in connection with those weirs, for which we paid 6,300 *l.*, and 3,000 *l.* odd for legal expenses, bringing it up to nearly 10,000 *l.* The object of

*Chairman*—continued.

that was to take the whole of the weirs away from the control of the millers. Questions have been asked here with regard to what the millers could do to increase the floods; what I believe they can do, but it is almost infinitesimal, I should say is this, they may shut in what they call their gates, that is just the place where their wheel is, in order I presume to keep the floods from damaging the wheels; but they have no control whatever over the height of the water at the wheels. The control of the height of the water rests entirely with us; we have high water marks and low-water marks; our lock-keepers have instructions what to do, and our superintendents have instructions to supervise them. I am happy to say, of late we have had very few complaints with regard to the millers. We have a very excellent gentleman who is a miller at Sonning on our board, and perhaps that may help to make things go smoother between us and the millers. But I wanted to put it quite clearly with regard to the control of the weirs and the head of water, the millers have no sort of power over that.

2521. You heard Mr. Leach's evidence with respect to the modes that he would like to see carried out for the reduction of floods. Is it your opinion, and that of your board, that if these measures of straightening the river, of dredging, of enlarging the tumbling bays, of removing shoals, and reducing the cuts, were carried out, that, except in excessive floods, the river would be able to carry off the flood-water?—There can be no question that the river would be improved, and, so far, I go with Mr. Leach, but I want you to allow me to make an explanation with regard to some evidence which was given at the end of Mr. Leach's evidence the other day. Mr. Leach brought forward a plan for improving the river below Staines. What I wish to explain to the Committee is that that plan has only been quite recently prepared; it was prepared by Mr. Leach in consequence of a resolution of the board, given in general terms, to report to the Board what might be done below Staines; I think it must be obvious to the Committee that that plan cannot possibly be carried out without an Act of Parliament, and 63,000 *l.* seems to me an enormous sum to pay for mitigating floods, which, I do not believe, have done very much damage below Staines; but what I want to impress upon the Committee is this, that that plan has never been considered by the Conservators; and, more than that, the information which Mr. Leach gave you, with regard to the rating of certain parishes, is entirely his own idea. Very naturally he looked to see where the money could come from, but that proposition has never been before our board in any shape whatever. When a proposition like that comes before our board, and when we know that it cannot be carried out except by an Act of Parliament, we do not immediately take it up, because, as you know, no Private Bill can be introduced until next Session. I only wish to impress upon the Committee that, although the plan is a very interesting one, it has never been considered by us.

2522. As regards the plan of expending nearly 30,000 *l.* on the upper part of the Thames, near Oxford, what have you to say to that?—That would have been done years ago, if it had not been that the Conservators were bad negotiators

*Chairman*—continued.

tiators, and the landowners in the district were very obdurate; and from these two facts we had to withdraw all the clauses; otherwise I am perfectly certain that would have been done by this time; I believe that nobody doubts that that is an excellent plan.

2523. Do you think that now any change has come about in the minds of the landowners upon that point, and that they would be willing to see these works carried out?—I do not think they objected to the works, but they objected to the rating powers which we sought to obtain.

*Mr. Cartwright.*

2524. Do you think that they would not object to the rating powers now being vested in the Conservancy. Have you any reason to think that?—I have not the least idea; I hope they

*Mr. Cartwright*—continued.

will not if it becomes necessary to give us money in that way.

2525. You have no reason to think that there is any modification, on the part of the landowners, of those views which made them fight your Bill upon that occasion?—I really do not know.

2526. You have no reason to think so?—Nothing has occurred with reference to it since that time. The gentlemen who chiefly opposed us then are now the Thames Valley Drainage Commissioners, I believe, Colonel Harcourt, for instance, the Duke of Marlborough, and other gentlemen who have property in the neighbourhood of the river above Oxford, and it was chiefly for the improvement of their property that the Thames Valley Drainage Commissioners were appointed, I believe.

Admiral Sir  
F. Nichol森,  
Bart, C.B.

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Monday, 25th June 1877.

MEMBERS PRESENT:

Mr. Coope.  
Mr. Cartwright.  
Mr. William Henry Gladstone.  
Mr. Hall.  
Sir Trevor Lawrence.

Mr. Richardson-Gardner.  
Sir Charles Russell.  
Mr. Walter.  
Mr. Watney.

OCTAVIUS EDWARD COOPE, Esq., IN THE CHAIR.

Sir FREDERICK NICOLSON, Bart., C.B., re-called; and further Examined.

Sir F.  
Nicolson,  
Bart., C.B.

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The *Witness*.] MAY I make a brief addition to my evidence?

*Chairman*.] You may make any additions you like.

*Witness*.] I stated to the Committee on Friday last, that the lower fund had advanced 8,804*l.* to the upper fund, but I forgot to add that no interest has been charged on that sum, so that the upper fund has had the advantage of that sum without interest.

*Chairman*.

2527. The lower fund has advanced to the upper fund 8,000*l.*, and up to the present time has made no charge for interest?—Up to the end of December. I wish also to state that any advances from the lower to the upper fund should be made a first charge in any future financial arrangements, so that they may be repaid without delay. With reference to the water companies, I hope I made it clear that my suggestion was this: that a moderate additional contribution might be asked for from them, which would be almost infinitesimal as compared with the large amount of water which they draw from the river, and distribute to the various places they supply. And I should like to add, that I find the Lee Conservancy fund receives from two water companies which draw water from the Lee, from the New River Company 1,500*l.* a year, plus 333*l.*, and from the East London Company 2,000*l.* a year, and 667*l.*, making a total of 4,500*l.*; besides that, the New River Company have paid 42,000*l.* for works on the River Lee, which, if you take it at 5 per cent., would represent 2,100*l.* more.

2528. What description of works have the New River Company there?—I am afraid I cannot inform you of that exactly. I am only stating what I know, having received it from the Lee Conservancy; that they really receive 6,600*l.* altogether from the two water companies.

2529. They pay that to the Lee Conservancy?—Yes.

2530. And this large sum of 42,000*l.*?—Yes, so I am told; and I think it is a fair way of putting it, that at 5 per cent. it would produce an income of 2,100 a year, which would bring up the total to 6,600*l.*

*Chairman*—continued.

2531. And the respective contributions of the six water companies to the Thames Conservancy is something like 6,500*l.* a year?—That is excluding the lower fund contribution.

Mr. Cartwright.

2532. What do you put the payment for the water companies at?—I have put it in, and having put it in I have not got my document.

2533. It is in the evidence you gave?—Oh, yes; quite clearly, on Friday. It is all accurately in the evidence.

*Chairman*.

2534. Yes, 8,000*l.* at present; and it will be 8,500*l.* for each in 1881?—Yes, including, of course, the 1,450*l.* to the lower fund. Those are the only additions I wish to make at present.

2535. Have you any remark to make upon any of the evidence that has been given to the Committee?—I should like to make some remarks, and I will do it as briefly as possible. The first witness was Mr. Taylor. He had evidently not studied our Acts; I believe he said he had not read them, and I think I may pass over all his evidence with regard to our jurisdiction, and so on. He also quoted a good many figures which he got from a letter of Colonel Harcourt's to some local paper, I believe; but as you have all our figures put in, I need not refer to that. He also touched upon a point with regard to the employment of women at locks. I just wish to explain that, although Mr. Leach has been asked as to that point. There are two, one at Hambledon, and the other at Penton Hook. The woman at Hambledon has two sons, both grown up, who help her at the lock. We only kept her on because her husband died who was a lock-keeper; she was quite competent to go on with that work, in fact, she had done it when her husband was ill, and we kept her there. The woman at Penton Hook is on the lower navigation; she has been there for many years, and she is quite capable of opening or shutting a lock; she has also a grown-up son to help her. I should like to say that we should never think of appointing women in the future, but we keep these two under exceptional circumstances.



*Chairman—continued.*

cumstances. There is a remark of Mr. Taylor's about flooding; he says, "My flooding is not from the Thames water, but from the oozing up from the gravel." I believe that, in many cases, the flooding of houses arises, not so much from the Thames as from the water that comes down from the slopes of the hills. A friend who lives at Henley told me he had seen the cellars there quite flooded when the Thames was not flooded; that, in fact, he had traced the water along, in shore, as it were, from the Thames, and found the water there higher than in the Thames, consequently it could not have come from the Thames; it came down the slopes of the hills, and I believe in many cases, where the Conservators have been accused of helping to keep the floods over the lands, the water has really come down from the slopes of the hills. I know we had one case from Mr. Mackenzie. He put in a claim for one of his tenants; our engineer reported very elaborately upon it, and it turned out that if he was flooded, he was flooded in consequence of the water coming down from the hills behind him.

2536. And not from the Thames?—I daresay that some part may have come from the Thames. At all events it was not exclusively from the Thames. I need not say much about the Dean of Christchurch's evidence, especially as he is present; but I should like to read an extract from a letter which we received from the Dean at the time we were thinking of improving the neighbourhood of Oxford with regard to floods. He says, "I have taken the first opportunity of bringing your letter of the 3rd instant before the governing body of Christ Church. I am directed to say that they thank the Conservators for sending them the plan and estimates, that they think the plan excellent, and are exceedingly anxious to see it executed. Further, that they would willingly contribute towards the execution of the works, both as landholders in the valley and as having an interest in the sanitary condition of Oxford if they saw any reasonable prospect of raising the sum required by subscriptions. But from all they hear they feel sure this is almost impossible. They think that the only way to affect this most desirable object will be by introducing a Bill into Parliament giving powers to the Conservancy to levy rates on all landowners, and on others who may receive benefit from the improvement of the river in proportion to the benefit received.—(signed) *Henry Liddell*, Dean of Christ Church." (*Copies handed in.*) There were other letters which were written just about that time in consequence of our sending the plans, and Mr. Leech and Mr. Beardmore's report, of which you have a copy handed in, to the various authorities at Oxford; and it was in consequence of these letters that we started that attempt to benefit Oxford.

*Mr. W. H. Gladstone.*

2537. What is the date of that?—March 1869. It was previous to the Bill you have heard so much of. I think I have already dealt with some of Mr. Hawkins' evidence, but he is asked a question which I should like to answer for him. He is asked with reference to the veto of the conservancy over the works to be done in the river, and the reference to the Board of Trade; he is asked how that worked, and his answer is, that at present no works having been begun in 0.114.

*Mr. W. H. Gladstone—continued.*

the Thames it is impossible to say, but it is hardly likely to be satisfactory. Mr. Ellett, a gentleman who has to do with the district board higher up the river, also gave evidence that the reason they had done no works was that they did not like the idea of having to send plans, and so on, to us, as we might put a veto upon them, and notwithstanding the reference to the Board of Trade they had done no works for that reason. What I wish to explain to the Committee is this, That for 20 years we had been weekly, at our meetings of the board, dealing with applications of the same nature, applications for works in the river; and, if the Committee wish to know what our course of proceeding is, I can briefly state it, and I think they will see we take the greatest pains not to object to anything that is reasonable, and, at the same time, rigidly to exclude anything that might be objectionable to the navigation of the river.

2538. What is the mode of your procedure?—Our mode is this, and it is one of constant occurrence; we have complaints sent in. If it is a small matter and is, on the face of it, unobjectionable, the board would at once approve of it, if, on the other hand, it requires consideration we should refer it to a committee; we should also, if necessary, ask the engineer to report upon it, and if we found the works should be modified, we should, as we have done in many cases, place our engineer in communication with the engineer of the person or body who wished to do the works, and I think, in almost every case, they have come to some arrangement by modification of the works, and so on, to make the thing quite unobjectionable. The committee then reports, and the board finally decides; and, if it is in the tidal part of the river, the whole thing goes to the Board of Trade for approval, and to the assessor for assessment, because there is an assessor who is appointed by us and by the Crown to assess all works; and after assessment a third of the payments, as you are I daresay aware, goes to the Crown. What I want to impress upon the Committee is, that for 20 years that system has worked on all parts of the river without any reference to any person whatever as an arbitrator; that is to say, the Board of Trade, who have the power to decide in case of our disagreeing with the Thames Valley Drainage Commissioners, have no power whatever with regard to the lower part of the river as respects works to be done. The reference to the Board of Trade is limited by the recent Act of 1870 or 1871 to the district over which the Thames Valley Drainage Commissioners are permitted to do their works.

2539. Do you consider that the distance between the head-quarters of the Drainage Commissioners and London is a great impediment to the due and harmonious working of the two bodies?—I do not think so, in the least, because I forgot to mention that in nearly every work of any magnitude, I was going to say in the case of any work, we always go to see it, and we should do so undoubtedly with regard to works in that part of the river. Hardly a week passes that some of our body are not visiting various wharves and places of that sort; and in the case of wharves where there are adjoining neighbours, we are now very careful, and always have been to a certain extent careful, that the neighbours

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bours should send in a written adhesion to the proposal, in order to save future litigation, of which we had a case at one time. I was going to read an answer of Colonel Harcourt's, but having spoken to him since I came into the room, I understand his answer is that if the interests of the navigation, and the interests of the drainage, are managed as they ought to be, he does not see that they could interfere with each other at all. But I believe Colonel Harcourt's explanation is, that he meant if they are managed by one body. Now, I maintain, that even if they are not one body, that is those who manage the drainage and those who manage the navigation, provided they are properly managed, the two bodies will not come into conflict. In that I entirely agree with Colonel Harcourt, and, of course, *a fortiori*, if they are one body they will not interfere with each other, although there might be possibly dissensions even in that one body.

2540. I will just, upon that point, ask you, although I believe you have already answered it, whether you are of opinion that the Thames Conservancy, with increased powers given them for mitigating the floods and for raising funds, with the Drainage Commissioners as a separate body, and with some public department as a referee in particular cases of disagreement, that under such an arrangement we might look to the whole of the river being well and efficiently managed?—I have no doubt about it. I skip a good deal of the evidence, because some of these gentlemen hardly seemed to know the names of things on the river; but Mr. Bryan Wood said something about some correspondence; I will not trouble the Committee by putting it in, but I have copies of the letters, in one of which he thanks us for certain communications; he seemed to have forgotten that, for he really did not seem quite to know whether we had answered his letters or not; and I wish to remove the impression that we are in the habit of not answering letters.

2541. I presume the Thames Conservancy is managed on the same principle as most other public bodies?—I hope so. I only mention this, because some of the witnesses have positively said that they have written to us and could get no answer. One witness, in answer I think to a question by yourself, said he did not write to us because he thought he should not get an answer. Then Mr. Castle suggests the buying up of the mills; that is a question for the Committee; 25 millers at 5,000 *l.* each would, I am afraid, amount to a very large sum, but with regard to his suggestion I need hardly say we have not the funds to do anything like that. There was some evidence given by Mr. Bryan Wood as to weirs removed above Oxford. Mr. Leach, I think, has told you there were eight removed; but you must not suppose they are weirs such as Teddington Weir; they were mere wretched dilapidated old structures, which were a disgrace to the river and an obstruction to the navigation, which kept up floods, and it would have been quite absurd to have attempted to have repaired them, so we simply removed the old piles and sticks which were there. I only wish the Committee not to suppose that these were large structures.

2542. They were dilapidated weirs?—Entirely

Mr. W. H. Gladstone—continued.

so, and very small; the river is narrow up there, and they were an obstruction.

2543. Upon the question of weirs, have the conservancy considered the point as to any action being taken with reference to the Sandford Weir, of which we have heard a great deal as affecting the flow of the river?—Mr. Leach I think has told you that certain works which he and Mr. Beardmore suggested would have had the effect of mitigating any disadvantage that might arise from Sandford Weir. I can hardly go into the details of that scheme now; they are engineering details, but I believe they would have had the effect of mitigating any disadvantage from that weir.

Sir Trevor Lawrence.

2544. While you are on the Sandford Weir, may I ask was not Sandford Mill burnt down?—Yes.

2545. Was any attempt made at that time to get rid of the weir, because it would seem a favourable opportunity of dealing with the question; the mill having been accidentally destroyed?—Yes; but, you see, any improvement there really is an engineering question.

2546. However, nothing was done?—I think not. There is just one more point which I wish to mention. Mr. Dodd, a gentleman from Eton, I was glad to find, confirmed our statement upon which the honourable Member on your left has asked several questions with regard to the excessive floods. He was asked whether he had noticed the floods, and whether they had occurred periodically, and he says from 1852 to 1875 we had a long period of very few floods, there were no very high floods between those times, and he says it is difficult to define what a flood is. So it is, perhaps; but I only wish to say that in a report with which you are well acquainted, there is a statement with regard to these excessive floods, which Mr. Dodd confirms. Now I come to a point which we are a little puzzled about, and perhaps the Committee will allow Mr. Leach to give further evidence about that. It has been suggested by a great many witnesses, and I believe there is a gentleman going to be examined to-day, who also thinks that we have raised the sills of the weirs. I have asked Mr. Leach about that several times, and so far as I know, and so far as he knows, we have never raised any sill of any weir whatever, but that is a mere question of measurement, and Mr. Leach will carefully ascertain that, and if he cannot do so before the Committee finally closes the evidence, because it might require a little looking into, perhaps you will allow him to give you the information, and we shall take care that it shall be accurate.

Chairman.

2547. Certainly; have you any suspicion that the millers may surreptitiously have raised the sills of the weirs?—Oh no, that would require certain works to be done.

2548. And, of course, they would come under the notice of the engineer, if they were done?—I should think so. There are just one or two other points. Several witnesses have stated that local taxes have been occasioned by the acts of the conservators, which simply means that we have

*Chairman*—continued.

have been carrying out the duties which Parliament imposed upon us, of keeping the sewage out of the river. I am informed, however, that the state of drainage in some of the towns was such that, whether we interfered or not, an improved system of drainage was absolutely necessary, and that our action in expediting that improvement has been very beneficial. There is a point upon which I should like to make the minds of the Committee quite clear, namely, the breaking through at Teddington. It was supposed, I think, from some of the questions which have been put, that the break was in the bank of the river; that is not the case; it was in an island between the weir and the lock. I do not know whether you know the locality.

2549. A plan of Teddington Weir was produced the other day?—That will explain at once why the lands adjoining could not be flooded. The flood made a breach, and flowed over the island, and flowed into the tidal part of the river. Then Mr. Rawlinson was asked some questions about the River Pollution Act. I do not know whether the Committee are aware that the Thames is not included in that Act. He was also asked, which, of course, he could not answer, as to whether the water companies had made any complaints to the Conservators. We have had no complaints from them; two or three letters passed many years ago, soon after we took the upper district, with reference to our clearing the river, and as we have heard nothing since 1869, I presume that the water companies have been satisfied with what we have done. I have several documents to put in; shall I do it now?

2550. If you please, if you will state to the Committee what their purport is?—The first is a very important one; it is a statement of the works in hand, of works ordered, and works which would be proceeded with at once. The works in hand amount to 1,037*l*. I must tell you this is dated the 21st of April. We wanted to see what we could do with the money we hoped to have during this year. I need not remind the Committee that the season for works on the river is the summer season. The works ordered amount to 1,110*l*.; the works which should be proceeded with amount to 5,501*l*., and the works in the district beyond Oxford, 1,028*l*., making a total of 8,076*l*.

*Sir Trevor Lawrence*.

2551. Are those works which should be proceeded with forthwith connected with the question of floods?—In some cases, no doubt, the improvements would affect the question of floods. For instance, I am coming to a heavy item for Bell Weir, where certainly there would be improvements made to facilitate the floods. I have it here, 2,000*l*. for Bell Weir; and Mr. Leach is prepared to make certain improvements there which will help to mitigate the floods. Then there is a list of other works required, in addition to those enumerated; I will not read the items, except to say that some are very large, especially Marsh Lock. The repair of Marsh Lock is a very heavy work. I am sorry to say that the grand total will amount to 20,420*l*.; and then the river will be in proper order with regard to the locks and weirs. Now, there is a nice point with regard to banks; and, if any Bill is introduced into Parliament with reference to the

0.114.

*Sir Trevor Lawrence*—continued.

upper river, that is a question which ought to be dealt with in some way or other; it seems nobody knows who ought to repair the banks. I do not mean the top of the towing-path, where our horses go along, but the upright bank of the river. We have, in some cases, been obliged to do it, to prevent the towing-path tumbling into the river; but there is an item of 3,000*l*. to be added, if that liability rests with us. Then I have a return showing the moneys advanced to the upper navigation, giving the details. I do not know whether you want that in; I have already stated the amount.

2552. If it is your desire, put it in; but we have a somewhat similar statement in this report?—I think you have it.

*Mr. Cartwright*.

2553. Is that according to the years?—Yes, it is.

*Chairman*.

2554. Then perhaps it had better be put in?—These sums are advances; the legal expenses under the Act of Parliament form one item, and the other is an item really to prevent the works tumbling into the river. Then there are the compensation claims, upon which I have already given evidence, the grand total of which amounts to about 10,000*l*.; I will put that in. Then here are the amounts borrowed from the Public Works Loan Commissioners; when each amount was borrowed, and showing the amount repaid down to the 31st of December 1876; in fact it is brought down to the 20th of June 1877. Here is a document which I had better put in, because there is a long letter from us to the Board of Trade about it. There was a meeting held at Gloucester, and certain resolutions were passed; those resolutions were sent to the Board of Trade, who sent them to us; and upon those resolutions, at the request of the Board of Trade, we wrote a letter informing the Board of Trade why more had not been done on the upper part of the river, above Oxford.

*Mr. Cartwright*.

2555. Was that a meeting which was held last year?—At the beginning of February this year, I think; on the 6th February.

2556. With reference to the navigation?—Yes; I have here some correspondence with Mr. Taylor, the first witness you had, which I will put in.

2557. What is the date of that?—The 8th December 1876. He says, the floods are again causing loss to his company; and I will put in our engineer's report to us upon it. Then, the Staines Local Board asked us to take a weir away; they first told us our weir was illegally built; then, they wanted it taken away, and then they did not. However, here is the whole correspondence, and I will put it in.

*Sir Trevor Lawrence*.

2558. Is that correspondence important?—It is important in this way, that it has come before you that this that and the other has not been done, and was not attended to, and we show the correspondence which has taken place with these very gentlemen.

T 2

2559. You

*Sir F.  
Nicolson,  
Bart., c.b.*  
25 June  
1887.

Sir F.  
Nicolson,  
Bart., c.B.  
25 June  
1877.

Chairman.

2559. You consider that a charge having been brought against the management of the Thames Conservancy, you have a right to repudiate that by such correspondence as you are able to produce?—Yes; I have here a very interesting Return which was laid before Parliament by Mr. Sclater-Booth with reference to sewage notices. Some questions have been asked about that question; it is already a Parliamentary Paper, therefore I do not know whether you would like to have it put up with your Report.

2560. It may be referred to as a Parliamentary paper?—The date of it is the 12th July 1876; it is a Return to the House of Commons by the Local Government Board.

2561. Supposing a Bill were brought into Parliament giving you larger powers and more ample funds for the purpose of diminishing the floods, it would be needful, doubtless, to add to your board parties who would be interested?—I thought I had answered that question on Friday.

2562. You expressed your feelings on the subject, that you hoped as little addition would be made as practicable?—As little addition, and as little alteration; of course, my proposition is, that you have an easy solution of the whole problem by getting more money from the water companies; and then, as I said before, we shall be quite ready to receive any representative from those bodies. Of course, what I presume your question alludes to is the question of rating, and of consequent representation. I can only repeat what I said before; we already have elected members connected with the upper dis-

Chairman—continued.

trict, and one appointed by the Board of Trade. Of course, if we are to have large contributions of money, which are to be produced by rating, it is evident that some members would naturally have to be elected to sit on our Board.

2563. Do you think that a board consisting of 30 members would be unwieldy?—Our average attendance now is 20, and we find that quite large enough; at least, I find it so, as chairman.

2564. You stated, in evidence, that in one of the Reports affecting the Thames Conservancy, it was suggested that the number of members of the Corporation of London should be reduced to three?—Yes, that was the Report of the Committee of 1863; but the Committee of 1864 did not carry out that recommendation, they left the members of the corporation intact. But, as I stated on Friday, the corporation and the Government came to a compact, and the result was, that seven members of the corporation and five other members formed the original board, and that now the corporation still number seven, whereas the board is now 23.

2565. Therefore, if the number of the Board be increased, say, for the sake of argument, to 30, *pro tanto*, the influence of the seven corporation members would be diminished?—I do not think anything will diminish the great influence of the Corporation of London.

2566. Perhaps you will come on Friday next, as your evidence has not yet been printed, and we shall be glad to take your further evidence?—Certainly.

Mr. GEORGE HENRY VANSITTART, called in; and Examined.

Mr.  
Vansittart.

Chairman.

2567. I think you are a Landowner, and possessor of land adjoining the Thames?—Yes, and a good deal affected by the Thames, in the valley of the river.

2568. Does it reach down to the Thames?—Yes, it reaches for rather more than two miles along the river from Temple Mills down to below Marlow.

2569. Whereabouts is that on the river?—Just a mile above Marlow.

2570. Is your land subjected to floods?—Partially; a great deal of the grass land is generally flooded, but that we consider does good to the grass land; the arable land it does harm to, especially where the water lies upon it, and is not able to run off quick; and for that reason I should be inclined, in my case, to object strongly to any plan for embanking the river, as has been suggested; because the under-soil is porous, the water runs up, and yet sometimes it does not run off quickly, so that any embankment would check the running-off, and create an evil on the arable land.

2571. Have you any high lands on your property?—Yes, I have some high lands.

2572. Does much water come down from the slopes?—No; ours is a chalk soil, it almost all is absorbed; but in high floods, along our part of the river, land-springs occasionally break out above the level of the river, and I do not think they do any harm to speak of; but the arable

Chairman—continued.

land is only flooded to any extent in very high floods, like those of the two last years.

2573. Have you noticed the appearance of the water of the Thames in time of floods?—Yes, it is very thick; its colour varies according to the water which is coming down; that is to say, we can tell the London water, the Kennett water, and the Oxford water, when it comes down.

2574. Have you anything to remark on the action of the Thames Conservancy, as regards your property?—I have no complaint whatever to make of the action of the Thames Conservancy as affecting my property, as regards floods, I mean.

2575. Is there any weir affecting your property the removal of which you think would diminish the floods?—Of course the removal of Marlow Weir would, no doubt, lower the river exceedingly; but there are two large mills there, and I have always looked at it in this way, that the expense would be utterly disproportionate to the good done by a removal. As you have alluded to weirs, I might mention a suggestion first made by Mr. Weedon, who has left Temple Mills, which were above here, for some time; but he constantly spoke to me, while he was there, of a plan which he said was constantly carried out in other districts with very great advantage, of having a different level of the weir in winter to the summer; that is to say, that they had boards put in, which raised the weir in summer,

*Chairman*—continued.

summer, and they were taken away and put at a considerably lower level in winter.

2576. Flood-boards?—No; boards for keeping up the river in summer, and those were taken away and left the natural sill, so that the water could escape to greater advantage in winter. What I attach great importance to, if you begin to work with the lower part of the river-channel, is this: I cannot help thinking that as the tail-water is the great enemy to the millers in the winter, that that might be done, as opportunity offered, without any great loss.

2577. Then as regards the two rough schemes, one of embanking the Thames, and the other one of dredging and removing obstacles and straightening the river, which, in your idea, is preferable?—Oh, dredging, certainly, in my opinion; I look upon the straightening of the river and the making fresh cuts as a very expensive matter, but, of course, it is a question of expense.

2578. Should you, as a landowner, be disposed to contribute anything, in the shape of rates, to carry out improvements which would mitigate the floods?—Exactly in proportion as I should be benefited by it; but I have very little hope of your being able to do away with the floods which occurred last winter, and the winter before, when you see the enormous amount of land covered with water outside the bed of the river, and sometimes the great quantity of stream that is flowing down. In a very high flood there is sometimes a very strong stream running out of the natural bed of the river, and it is only a few places (for instance, at Henley Bridge and others), where the river is penned up into its natural channel. I cannot think anything that you can do will absolutely do away with floods, and I feel that if you were to give such an impression, it would be very dangerous, because it would induce people to do what I did to a small extent myself: I built some cottages just before 1852, at a place where for many years we had never seen any flood, and almost the year after the flood came up to about one foot over their floors.

2579. Then you consider Henley Bridge an obstruction?—No, it is a very good bridge; it is very little of an obstruction, but it was put in a place where it strikes me that at flood-times the water does not escape by side-channels.

2580. Do you know Maidenhead Bridge?—Yes, that is a very great obstruction, and so is Windsor Bridge, and there are some others higher up, but those are the chief ones. It would be a very expensive matter to remove them, and it would be easier to go round them. I suppose, if that were done, the localities benefited would contribute something, at any rate.

*Sir Trevor Lawrence.*

2581. With regard to the floods that took place last year, and the year before, those very high floods, did they do you or your tenants any material injury?—Oh, yes; one of my tenants and myself in the Home Farm suffered considerable injury, in the way of preventing crops being planted.

2582. The floods occupying the ground when it was wanted for agricultural purposes?—Oh, yes; the ploughed land was very considerably injured.

2583. Have you any idea what proportion of ploughed land of your property was injured by 0.14.

*Sir Trevor Lawrence*—continued.

the floods?—A very small proportion of my property, not a tenth part of my property; but in the valley of the river, I might say, last year about a third.

2584. Of course that proportion would vary according to where you put the limits of the valley?—Of course it would; but a great deal of my property is 200 feet or 300 feet above the river, and of course it would not affect that at all.

2585. Up to 1876 there had been a long period in which there had been no damage done from floods?—No appreciable damage done between 1852 and 1875 or 1876.

2586. If it came to be a question of excluding floods altogether, supposing it were possible, by embankment, and leaving things as they are now, that is to say, throwing away the good, and also keeping out the evil, upon which side would the balance lie?—I hardly understand your question.

2587. If it came to be a question of excluding from the operation of the floods those lands which are now benefited by them, and also, of course, keeping the floods off the land which are injured, so as to have a certain amount of good and a certain amount of evil, upon which side do you think the balance would lie?—In my case, if it were possible (which really it is not) entirely to exclude the floods, I would rather take the certainty of things, and I would rather have them entirely excluded. I might add one thing, which is, that I represent the upper district of the Conservancy, and I am sure of late years that nothing could work more harmoniously, and all my colleagues would wish to do everything in their power to make things continue so.

*Chairman.*

2588. Are you a Thames Conservator?—Yes, I am. They have used everything in their power to do away with floods; it has only been the want of money that has interfered with them in our part of the district.

*Sir Charles Russell.*

2589. Do you think all that is possible in the existing state of things is at present done in the way of opening the gates, &c., and reducing the floods, or do you think they are capable of more reduction?—People are mortal, you know, and people who have to look after weirs are people with low wages. I have heard complaints, and I think they may have been true in some cases, that the gates had been kept down longer than they ought to be; but I cannot speak from my own knowledge to that, although I think it is quite possible it may have been so. I think there might be improvements.

*Chairman.*

2590. I do not know whether you quite understood Sir Charles Russell's question, whether in the present position of your arrangements, with increased vigilance, you could mitigate the floods, or whether other works are necessary?—I think the floods might be very much mitigated with our present arrangements if we only had the money. Of course you understand that different things require different powers altogether: for instance, it may be a question in certain localities whether they may entirely buy up a mill, or may make

Mr.  
Vansittart.  
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Mr.  
Vansittart.  
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Chairman—continued.

make such arrangements that they will be able to lower the water; for instance, in such a case as Windsor, whether they might make a cut into the playing-fields, or above Maidenhead, whether they could make a cut at Cookham. There is a bridge in Maidenhead where the flood runs very

Chairman—continued.

strongly, and perhaps it would be desirable to make a cut below Bray. But those extraordinary works I put out of the question, because they could not be done unless it was worth while for the district to contribute something towards them.

The Rev. FLORENCE THOMAS WETHERED, called in; and Examined.

Rev. F. T.  
Wethered.

Chairman.

2591. ARE you a Conservator?—No, I am not.

2592. Are you Incumbent of Marlow?—I am Vicar of Hurley.

2593. You have had many opportunities of observing the state of the river?—I have.

2594. Is your parish flooded in times of flood?—Yes, very much so indeed.

2595. Is the land injured or benefited thereby?—It is stated by landowners of the parish that the meadow-land is benefited. I do not think this is altogether the case. In the case of meadows immediately on the river, no doubt, after a flood there may be a larger crop of grass, but I think it must be considered, as against that, that the quality of it is decidedly coarser. I rent a meadow about 150 yards from the Thames, and I find that when the water remains for any length of time upon the grass, which it does, in flood-time, in one particular part of the meadow, the grass is very seriously damaged; in fact, it is, I was going to say, almost killed. I should say the water I have referred to in my meadow arises in some measure, not from the surface water of the Thames, but comes down from the hills which form the watershed of the Thames; it oozes up from below very often, before the Thames overflows its banks. I notice water in my meadow, and then the Thames overflows its banks very shortly afterwards; the result is that a large amount of water is collected, and if it remains for any length of time on the land it does harm, but when the water flows rapidly off I do not think it does harm. I am not sure, when it flows off rapidly in my own meadow, that it does any good; but I can imagine, with regard to meadows immediately on the banks of the river, when the water flows rapidly across them, that there will be more grass, but the quality of it will be decidedly coarser.

2596. Do the floods reach any houses or cottages in your valley?—Oh, yes; we have had serious damage done by them. Taking the last 10 years, there have been five or six instances where the water has been out a length of time in the roads, so that we have had to use punts, carts, and so on. Especially in 1872, the effects were such that in three contiguous cottages which were flooded in one part of the parish five or six deaths occurred from typhoid fever immediately after the water went down, and we attributed them more or less to the floods, from the damage to cesspools, and so on.

2597. Then after a flood in your parish you would rather expect cases of sickness to occur as the result?—Yes, I think so, certainly. I have given one instance (in 1872); and this last winter we had a man who was paralysed shortly after the floods went down, and the medical man in the neighbourhood attributed his paralysis, to a great extent, to his getting wet in wading through the

Chairman—continued.

water from the lower part of his house to his work. He is, I am afraid, injured for life, and the medical man states it is largely owing to the floods.

2598. Who is the principal owner of property in your district?—Sir Gilbert East.

2599. He has given evidence that the floods are decidedly an advantage?—Yes, I was alluding to him when I said I was aware that it was stated by landowners that such is the case. They are in a better position to judge perhaps than I am; but I should say, from my own observation, that although there is a larger grass crop in the meadows immediately adjoining the Thames, yet, certainly, the water is not altogether beneficial to the land. Arable land it certainly damaged, and when it rests long on meadow land I think it does harm. I daresay it does good to a certain extent and in certain ways, but I think it does not do unmitigated good even to pasture land. I have no doubt, as I say, that, when the water does not stagnate, there is a larger crop of grass in the meadows immediately adjoining the river after floods, but I think it is coarser.

2600. As representing the interests of your parishioners, you would be glad to see measures taken for diminishing the floods?—Undoubtedly.

Mr. Hall.

2601. Have you made any complaints to the Conservancy Board owing to the damage done by those floods?—No.

2602. And has none been made that you know of?—Not that I know of.

Mr. Watney.

2603. Have you any remedy to suggest for the floods?—I think the Conservators should have more power given to them with regard to the mills. I think from the provisions of the last Act of Parliament they have to be very careful how they interfere with the rights of millers. I do not mean to say, by any means, that the millers' rights should not be considered, but I think, at the same time, it is very important to keep down the floods, especially in certain localities, and that some arrangement should be made (though I am not prepared to say exactly what), due consideration being had for the rights of the millers, by which, at certain times, the Conservators should have entire control over every sort of sluice on the Thames, mill sluices included. I believe it would be a very good thing if, while the river is rising (not when it has come to a head, because prevention is better than cure, but while the water is rising), the lock-keepers were ordered simultaneously, when possible, to open all four gates. I am told that arrangements might be made, in some cases, by which that would be possible, and where it is possible they should be told to do it. Where it is not possible I think

Mr. Watney—continued.

I think, at any rate, they might open all the sluice gates of the locks, so as to let the water off while it is rising. I think very often, with regard to the weir locks, the flood gates may not be drawn in proper time, and I am quite certain that with the present appliances the floods might be stayed to a great extent if proper precautions were taken.

2604. What I understand from you then is, that after a rainfall, when the river is getting swollen, you would have the water let off?—Yes, before the land has got saturated. When the land has once got saturated the water goes down, say, after a while, but at the least encouragement afterwards, when any rain comes, up comes the flood again, because the land has got so thoroughly saturated. I think the great thing to do would be to keep down the water as early as possible in the flood season.

2605. Do these floods arise at all from the water coming up from the land?—I think so.

2606. As much as from the overflow of the river?—No, not as much, certainly. May I be allowed to make another remark. I have had opportunities of judging of the works on the river during the last 10 years, and I am prepared to say, most distinctly and advisedly, that the works on the Thames, the locks, weirs, and so forth, are in very much better order now than they were 10 years ago. I remember, I think

Mr. Watney—continued.

it was in the year 1866, rowing down from Oxford to Hurley, and I well remember rowing down from Oxford to Hurley in 1875, and I was struck, on the latter occasion, with the very great improvement that the Conservators had made in the locks, weirs, and so forth. I think it would be the greatest possible pity to unduly interfere with that body. Bearing in mind what small funds they have had at their disposal, and they have been very small, I think they have done wonders, and if properly supported, and more funds are given them, they will do, I think, very good work on the Thames. I can remember the Thames all my life; I have lived in the same house I live in now from childhood, and I think the improvement has been very great indeed.

2607. Your remark only applies to the repairing of the locks, not to the care that is taken of the river in keeping it lower in floods, if I understand you?—No, I mean all works.

2608. But, if I understand your answer to the previous question I put to you, there is no more care taken of the river now than there used to be, in fact, I think the floods have been higher lately than previously?—I certainly think that the dams, and so forth, might be opened sooner.

2609. Am I right in supposing that the floods have been worse lately than previously?—In my locality, certainly.

Rev. F. T. Wethered.

25 June  
1877.

Captain HENRY W. ETHERIDGE, called in; and Examined.

Chairman.

2610. You are in the employment of the Thames Conservancy?—I am.

2611. As superintendent of the upper navigation?—Yes, from Staines to Cricklade.

2612. What is your special duty as superintendent?—There is a printed list here of the duties, but there are various other duties besides (*handing in a list to the Committee*).

2613. I see by these instructions it is your duty to inspect the whole of the river, from Oxford to Staines, once a fortnight?—Yes.

2614. And from Oxford to Lechlade four times a year?—Yes.

2615. And from Lechlade to Cricklade twice a year?—Yes.

2616. And, I presume, you have carried out these instructions?—Yes, as far as it has been possible.

2617. How long have you been superintendent?—At the end of this year it will be 10 years.

2618. What is the state of the works of the Thames Conservancy now, as compared with 10 years ago, when you first undertook your duties?—They are very much improved indeed. For two or three summers after I was appointed the cuts were dry in the summer, and we could not get on at all; the works that have been since constructed have kept up the water wonderfully.

2619. In that part of the river are many of the locks and weirs now out of repair?—Yes, there is, no doubt, a great deal to be done at present, but a great deal has been done.

2620. Why has that which ought to be done not been done?—I suppose from want of funds.

O.114.

Chairman—continued.

2621. How do you think these funds ought to be raised, from your knowledge of the upper part of the river?—I should fancy, by a tax on the landowners.

2622. Rating the landowners?—Yes.

2623. And do you think the landowners would receive full compensation for any rating they might be subjected to?—I cannot say; I think they would receive a great deal of benefit.

2624. Have you seen a printed statement of Colonel Harcourt?—No; I have not seen any papers.

2625. But I understand you to inform the Committee that, as far as the funds have admitted of it, the navigation of the river now is in as good a state as it could be?—Quite so.

2626. As compared with years past; going further back?—Yes; since I have been on the river I can find a very great difference. The steamboat that the Conservators gave me first to do the work in I found would not float, and we were obliged to get a smaller one up; but the new works have so much improved the river of late years that the water has been kept up very well, and we have been able to travel with any description of boat.

2627. Have you been able to travel in the steamer that was first put at your disposal?—Yes, I have.

2628. Which would not float at first?—Which would not float at first; for the first two or three years when I was on the river.

2629. Up to what point can you get with that?—Right up to Oxford; and when the water rises in the autumn right up to Lechlade.

2630. What does she draw?—About 3 feet 6 inches

Captain  
Etheridge.



Captain  
Etheridge.  
25 June  
1877.

Chairman—continued.

6 inches when she is steaming hard; steaming slowly, about 3 feet 3 inches.

2631. How do you get up to Cricklade?—By pulling up in a boat.

2632. You say this steamer will not go further than Oxford?—Oh, yes; all the vessels will go right up to Lechlade; in the autumn time there is more water, then I can get above Oxford in the steamboat.

2633. You are called upon to inspect the river above Oxford, in February, May, August, and November?—Yes, in consequence of the water being deeper we can get on better.

2634. Are there any locks or weirs in particular, now, that you are anxious to repair?—There are several, but the engineer understands that part of the duties much better than I do, and I can hardly give an opinion upon what he thinks necessary.

2635. Yes, but what is your duty?—My duty is merely to report any defects in the locks.

2636. Then your duty is, to ascertain if the locks are out of order, and to report to the engineer?—Yes, I do that, but I cannot say exactly which lock the engineer will be prepared to go on to first; which he considers the worst.

2637. But I presume you, in the due execution of your duty, point out those locks which you consider the worst; he sees with your eyes, does he not?—No, he goes himself; is frequently on the river. I make a report, once a month to the board on various subjects, and mention in it the urgent repairs that are required at the locks, weir tackle wanting, &c. Mr. Leach gives instructions to his foremen accordingly. I occasionally write, or telegraph, on the spot. As for the great works, such as the foundations of the locks and the weirs, he of course knows much better about them than I do. I am not expected to report the exact state that these locks and weirs are in, because that is so thoroughly known by the engineer, but simply anything that has happened since my last visit.

2638. You reside at Reading?—Yes.

2639. Are you aware of that locality being much injured by the floods?—It is rather low at Reading, round by the Kennet.

2640. The Kennet goes through the town?—Yes, it does; and the banks of the Thames, by Caversham and about there, are rather low, and the meadows become flooded when these fearful downpours take place, and slightly flooded in moderate floods, occasioned by a few days' heavy rain.

2641. Have you any orders, in case of floods, to anticipate a flood, when there is a heavy rainfall, by taking any measures?—My orders are to keep the water up to high-water mark, for the passage of the navigation, and for the mills.

2642. Your object is to keep the water as high as possible?—No, to a certain mark, called high-water mark, and when it reaches that point the lock-keepers commence drawing; but, if by looking overhead, they find it is likely to increase above (before it gets up to high-water mark), they will draw some weir tackle before. They are the people who can judge better than anybody, being on the spot.

2643. Do you believe that, with the present system of weirs, by increased vigilance on the part of the officers of the Thames Conservancy,

Chairman—continued.

the floods could be diminished?—No, they could not be; because these men, who are on the spot, and have charge of the locks, form their opinion, and draw the water immediately it begins to rise rapidly. Taking them altogether they are an excellent body of men.

2644. You heard the evidence given by the last witness, Mr. Wethered?—Yes, but I could not hear all he said.

2645. You heard him state that, by increased vigilance on the part of those who had charge of the locks and weirs, the floods might be considerably diminished; is that your opinion?—No, it is not.

2646. Can you suggest anything further that can be done, with your present works, to diminish floods?—I have got a list here of what I think might be done, which would allow moderate flood waters to pass off, and, in fact, heavy flood waters to pass off more readily. Here are the different places at which dredging is required, and there are several bends which might be cut through, to allow the flood water to pass. I think if that was done, moderate floods and summer floods might be almost entirely avoided.

2647. These are works which you have in view?—These are shoals which I have noticed on my passage up and down, and which have increased lately.

2648. And which require dredging?—Yes: if they were scraped over to about seven or eight feet deep, not to make a hole, but to make a sort of uniform level, then the flood-water, I think, would be allowed to escape much better. Then there are several bends; there is a bend up at Kennington, and below Oxford, and there is another at Shillingford; and if they were cut through, the passage of the flood-water, I think, would be much faster in moderate floods.

2649. By making the upper part of the river straighter, and the water flow down more rapidly, would you apprehend that the lower part of the river might be flooded, say about Kingston?—I could not form an opinion upon that; I have nothing whatever to do any lower than Staines.

2650. Would it flood Staines?—That would be a portion where there are some shoals to be taken off. I do not know how the river is below that.

2651. Then dredging is much needed at Staines?—It is much needed from St. John's, the first lock, all the way down to Staines.

2652. Dredging is much needed down to Staines?—Yes; in the whole of my district, in several places.

2653. And were it dredged sufficiently, you think the floods would be much diminished?—I think they would more readily escape; that is the moderate floods and summer floods; but I think such floods as we had in 1821, in 1852, in 1875, and 1876, nothing could stop flooding. My observation in 1875 was, that the rain water came down over such an immense area of space from Oxford to Reading, and below, that the river seemed to rise altogether at the same time, and I think it rather a mercy that floods in these cases do take place.

2654. You stated that the floods of those years you think nothing would mitigate?—They might be mitigated; they might be passed off a little more rapidly, but they could not be avoided; and I think if they were confined within banks they would

*Chairman*—continued.

would tear everything before them, bridges, and everything that opposed them.

2655. But supposing the river were embanked on both sides, at some little distance from its banks, would that prevent its flooding?—No, because I have observed the water rises in the meadows before it has overflowed the banks; it rises in many places before the water overflows the banks. In that case which was spoken of just now, at Henley, I remember reporting to the Conservators about that field of Mr. Mackenzie's. That was never caused by the water overflowing the bank, because it never reached high-water mark at the time his land was flooded; you could see it rising a quarter of a mile off, and with the level of the Thames it rose.

2656. Do you attribute that land being flooded to the water coming from the slopes of the higher land?—Yes, and rain; the water in that valley rose as a pond; it made a large pond, until it came almost up to the banks of the river.

*Mr. Hall.*

2657. As far as I gather from what you said to the Chairman, your journey from Oxford to Lechlade is taken four times a year, and from Lechlade to Cricklade twice?—Yes.

2658. But I did not catch how often it was from Oxford to Staines; very much more often, I suppose?—Yes, every month. It was every fortnight, but it was found I could not get through all the duties. I devote so much time to seeing the men and their accounts, and the works, and am detained so much by gentlemen and others wishing to see me on duty. It was proposed at first to take their tolls and pay them every fortnight, but it was found it could not be conveniently done. I could attend to no other duties; it takes me four days to do the passage down from Oxford to Staines.

2659. What is the cause of the great discrepancy between your visits to the lower and the upper portions of the river?—Because there are so many lock-keepers and more to be done in the lower part.

2660. And the tolls, I suppose, are higher?—The tolls are the same, but the amount is much greater on account of so much more tonnage passing.

2661. Should you say the tolls in the lower portion would be three or four times as much as in the upper portion?—Very much more than that.

2662. Ten times as much?—More than that, I should think.

2663. Twenty times as much?—More than that, I should think. There is hardly anything taken above Oxford.

2664. You might take it at 50 times as much?—I should think so. I have noticed that at the bridges over the river, which are made, some of them, with tremendous buttresses, the water stands, in moderate floods, 18 inches up as I have been going under the bridges heaped up on the stonework.

2665. What would be, in your judgment, the difference in the tolls below and above Day's Lock; take from Day's Lock to Oxford and from Day's Lock to Staines, would the tolls be twice as much below Oxford?—I think they would be about the same, because the two principal locks, where we take the most money, are Osney

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*Mr. Hall*—continued.

Lock, at Oxford, and Blake's Lock, at Reading. Those are the two principal locks.

2666. But, speaking generally, surely the tolls from Day's Lock downwards, must be considerably higher than from Day's Lock upwards. Of course it is capable of being tested; but you ought to know, as being constantly up the river?—From Oxford to Reading we consider the upper half, and from Reading to Staines the lower half, and they are about 40 miles each way. The small tolls taken for pleasure traffic are simply tolls for boats passing from Oxford to Reading; and they may be about the same as from Reading to Staines. There is no tonnage toll taken at Day's Lock, at least, very seldom.

2667. But that is the general division of the river?—I generally divide it at Reading. That is about 40 miles each way, and there is another 40 miles from Oxford up to Cricklade.

2668. What locks are there that take the tonnage from Reading to Dorchester?—At Blake's Lock, Reading, the tonnage is paid; it is paid at the first lock they go through. The others take only pleasure tolls.

2669. Then we may take it, as far as tonnage tolls are concerned, there are none taken above Reading for a boat going up stream?—They would be taken at Reading, for any place between Reading and Oxford.

2670. And not again at all?—No. Then the cargo would be discharged, and they would proceed empty through the locks without payment.

2671. Would it be true to say, with regard to pleasure-boat tolls, they are considerably higher between Reading and Oxford, than between Reading and Staines, or *vice versa*?—I should think they would be about equal. I should think there was rather more pleasure traffic between Reading and Staines, than between Reading and Oxford. The pleasure steamboats come up; they do not go quite up to Oxford, generally speaking, and then they have a pass, which has very seriously interfered with the receipts. I have got all the amounts which were taken since 1868. The pleasure-boat traffic was reduced in 1872, that is, the tolls were reduced to more than half, and then it fell down about 1,000*l.* a year, down to the present time, on account of the reduction of the pleasure-boat tolls; and where the steamers and house boats paid half-a-crown at each lock before, they now get a pass, which takes no more money from them than one-half passage would have done before. They can now go for between 40*s.* and 50*s.*, according to length, for the whole year.

*Sir Charles Russell.*

2672. Where is Day's Lock?—Near Dorchester, some distance below Abingdon, near Whithenham. In 1871, the pleasure-boat tolls, before the reduction took place, and the barge tolls, amounted to 3,700*l.* Then when these reductions were made, and passes given to pleasure-boats, steamboats, and house boats, it fell from 3,700*l.* in 1871, to 2,729*l.* in 1872. That was for the whole year. The pleasure-boat tolls, taken for the year, of course, were principally reduced by the reduction of the pleasure tolls and granting passes to house boats, steamboats, and rowing boats.

2673. Will you give me those figures again, please?

*Captain Etheridge.*

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please?—The tolls I collected in my district, in 1868, were 3,519*l.*; in 1869, 3,597*l.*; in 1870, 3,564*l.*; in 1871, 3,700*l.*; in 1872, 2,729*l.*; that was the summer the reduction took place; in 1873, 2,628*l.*; in 1874, 2,738*l.*; in 1875, 2,642*l.*; and in 1876 it was about the same. I met with an accident, and I was not on duty at the collection of the tolls during that time.

2674. Are you the superintendent who is mentioned in this paper?—Yes.

2675. You told the Chairman that your duty was not to report on the exact state of the locks, but only if anything special happened?—If you have the list there you will find there are several duties all the way down assigned to me, and there are various other duties. If a gentleman makes a complaint against a lock-keeper, or other cases on the upper river, it is sent to the board and I report upon it, and sometimes settle it without referring to the board, if it is a trifling case.

2676. Have you got a report on the necessities for dredging in any particular place?—Oh, yes.

2677. Then you have reported, I presume, upon the necessity of dredging near Staines?—Oh, yes, and the worse parts have been done by the engineer. I simply report that the navigation is suffering from such and such a shoal, and then it is taken off immediately; but with regard to floods, I think if the river was deepened by taking the heads off many of the shoals, which do not interfere with the navigation (the water has been kept up so well of late years), the water would be able to travel more rapidly, and consequently go off more rapidly.

2678. Has it fallen to your duty to make any report with regard to Sandford?—Upon the position of the weir?

2679. Yes?—No, not upon the position of the weir, that would not be my duty.

2680. We were told by Mr. Bryan Wood that the pulling down of those eight weirs, which you have heard of, damaged the navigation considerably?—Well they did not want much pulling

Sir Charles Russell—continued.

down. They were only some old stumps and parts of old works standing about.

2681. Is it true that some of the *débris* is still there?—I have never touched upon anything during the time I have been up and down.

2682. But are you aware, as a matter of fact, whether that is so?—I do not know.

2683. Have you seen the report of Messrs. Falkener and Tanqueray?—No, I have not; but the engineer and his foreman are always about on the spot, and they would know if any piles are there.

2684. Are you not always passing up and down?—Not always.

2685. But constantly?—No, not constantly above Oxford.

2686. When did you pass last?—I have been unwell for a year. I broke my leg, and the river duty (that actually upon it) has been done by another gentleman, but I have done various other duties in connection with my appointment as superintendent of the upper navigation during the whole time.

2687. You have not formed any opinion as to whether the pulling up of these weirs was damaging to the navigation or not?—No, I do not think that it can interfere with the navigation at all. There are certain weirs in now; three or four weirs that are left in on purpose to keep up the head of water. There seems to have been a number of weirs there, and in former years they were used principally for fishing, I think.

2688. Will you tell the Committee whether the taking away of those weirs was accompanied with any dredging above the weirs?—I expect when Mr. Leach took them away he removed any shoals which were immediately above the weirs, and did anything which was required.

2689. But you cannot say of your own personal knowledge that the taking up of the weir was accompanied by dredging?—No; I do not know all that Mr. Leach did. It is only occasionally that I am required to go up there.

Mr. THOMAS JAMES NELSON, called in; and Examined.

Mr.  
Nelson.

Chairman.

2690. You are Solicitor to the Corporation of London?—I am.

2691. How many years have you been so?—Fourteen; and I am chairman of the Local Board of Hampton Wick, an urban sanitary authority opposite Kingston-upon-Thames. I reside upon the banks of the river all the year round, and I take very great interest in the River Thames. I may say it is my source of amusement and relaxation.

2692. How long have you resided there?—For 16 years. The walls of my house are actually within 40 feet distance of the river, and although I do not say I am there all the year, I have no other permanent residence.

2693. You were residing there this last winter?—Yes.

2694. Were you flooded?—No.

2695. Was the property in the neighbourhood of Hampton Wick much affected by the floods?—The floods went over a great part of Hampton Court Park, the Home Park, but I must say that the question of the floods was very much

Chairman—continued.

exaggerated, both as to their extent and the damage which they did. It seems to have been a subject which took hold of men's minds, and it was very much inflated. For instance, I saw a paragraph in one of the morning newspapers that the people were taken out in boats at Old Bridge-street at Hampton Wick, and I had been down the street the very evening that that paragraph was written; but to go to facts, the Thames rose this last winter 8 feet 9 inches above its summer level, at my boat-house, and it continued to rise, in consequence of the incessant rainfall, until 3 o'clock in the afternoon of the 11th of January. The burst which took place at Teddington Weir happened on the night of Friday the 5th, and the Thames continued to rise for six days afterwards. I can speak to it with great exactitude, for I had that which one often gets in rainfall and moist weather, a very bad cold. I was afraid to leave the house, and it was my amusement to watch the state of the river. I had a heavy mark put in by my gardener, which could not be washed away by

*Chairman—continued.*

by the flood, and I can tell you the exact hour at which it reached its height and began to recede. That was on the 11th of January.

2696. And then it reached 8 ft. 9 in. above its summer level?—Yes.

2697. And from that time it diminished?—Yes. It lasted in flood for a very long while, because there was an enormous quantity of land flooded, from which, of course, the water had to go off; but there has been one point with reference to these floods which seems entirely to have been lost sight of, and that is that no amelioration of the River Thames above Teddington Lock would deal with the flood question, because the River Thames below Teddington Lock cannot discharge the flood water. The floods were actually worse below Teddington Lock than they were above, because the river there has not only to take off the flood water but twice in the 24 hours it has the tide, and therefore the capacity of the river to discharge the water that is let down upon it is limited by what it can take in addition to the tidal water. If you were, therefore, to take out all the locks and weirs, and send the flood water from above, from Oxfordshire, Berkshire, and Buckinghamshire, into Middlesex, you would simply drown us, because the water cannot get down. I may say upon that, there was one road between Twickenham and Teddington, Strawberry Vale, which during part of this time was impassable; that is to say, horses and carriages could not go through it; if the water had been sent down quicker from above, it would only have made it worse. In fact, until you get down below Richmond Bridge, the tide ceases to be perceptible in a very heavy flood like that; that is to say, the rise and fall of the water cannot be marked. When you get down below there, between Isleworth and Kew, you begin to notice the difference between the high and the low level. Then a great many persons build houses, perfectly reckless whether they will be flooded or not. I may tell you that a house has been built in the adjoining parish to mine, a valuable house, which I daresay cost 4,000 l. in building, in which they put a part of the house which was to be occupied, the billiard-room, the kitchens and offices, at about 2 ft. 6 in. above the summer level of the river. If you come to have a flood 8 ft. 9 in. above the summer level, it is not a very difficult arithmetical question to know what depth of water must be in that house when a flood comes. Then a house in my own parish was burnt down, and they have built two houses where that one was, and they have actually built those houses last winter, and put basements in where they must be flooded when a flood comes again. Then there is a great outcry made by the unfortunate persons who take these houses, who do not trouble themselves to inquire whether they are likely to be flooded or not. I know another house in Teddington where the water came in at the back-door and went out at the front. It was empty all the winter, but it is taken now, and the man has found out that his house is liable to be flooded.

2698. I gather from what you state that the extent of these floods in the Thames has been very much exaggerated, and that any steps taken above Teddington Lock cannot tend to remedy  
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*Chairman—continued.*

the floods below Teddington Lock?—Certainly not.

2699. Have you any suggestion to make as regards reducing the floods below Teddington Lock?—No, I am afraid that the expense of dealing with the question of the floods would far outweigh the benefit which would flow from it.

2700. Are you of opinion that any steps taken to bring the water more rapidly from the upper river, would, if anything, tend to increase the floods below Teddington Lock?—It must.

2701. You seem to be of opinion, having read all the evidence, that that fact has escaped the notice of the Committee?—I have not seen that any of the witnesses have drawn your attention to it.

2702. Have you read the evidence of Mr. Leach, the engineer of the Thames Conservancy?—I have only had that put into my hands this morning; therefore I have not read it as carefully as I have the others.

2703. If he states that he considers that by certain steps which he recommends, such as straightening the river, dredging the bed, and removing obstacles that would remedy the floods in the upper river, and would not increase the floods in the lower river, you differ from him in regard to that?—Well, I am rather afraid of the engineers, because I agree mainly with what Mr. Woolley Dodd told the Committee, that is, that the difference between the water in the river in summer time and what there is when a flood comes, is so immense, that no remedies that could be applied to it could affect the flood. I do not think that if you were to dig two rivers by the side of the River Thames, you could prevent there being floods; those who see the immense body of water going by in winter time; the pace that it is going at, and the extent of the land which it is spread over, and compare that quantity in area with the quantity in the bed of the river in summer time, can see that one does not bear any comparison with the other at all; therefore, although by taking out shoals and straightening places here and there, you might, I daresay, prevent a summer flood, such as we had last July twelve-months; these winter floods, which we have had now, quite exceptionally for the last two winters, I do not think would be affected at all by it.

2704. Do you think it is in the power of the Conservancy to adopt measures which shall mitigate moderate floods, although they are unable to grapple with excessive floods?—I think so. I think that the works of the Conservancy might be put in a more efficient condition in the upper part of the river; of course, I am now speaking simply as a riparian resident, and not in my official capacity, in any shape or way; but I have known the River Thames for a very long while, I know it all the way down from Lechlade to the sea; I am continually going up and down it in my steamer, and there are a great many shoals which act as dams to keep the water back. Some of the weirs, of course, might be much better than they are; but the Conservators have done a great deal since they came into possession of the upper river. It was in an utterly ruinous and broken down condition before, and they have improved it very much. Perhaps the Committee will excuse my saying that the Thames is a source of great enjoyment to many  
thousands

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thousands of persons, I think next only to its being valuable to our metropolis for bringing its commerce to it; unless you have seen it during summer time, and have seen the hundreds of persons who will be found on the banks, and on the river itself, particularly on Saturdays and Sundays, you can have no idea how popular a source of recreation it has become.

2705. It has been suggested that there should be a tariff for pleasure-boats; do you consider that any income could be derived from that source?—I do not think that pleasure-boats as such ought to be taxed, because men very often have more boats than they want, and they do not care about parting with them when they have once got them, but if they had to pay an annual tax for them, perhaps it might rather interfere with the boat-builders. I think, perhaps, the rates at the locks might be somewhat increased.

2706. You would throw it upon the navigation?—I think so.

2707. Do you not think that pleasure-steamers, which are a great annoyance to rowing-boats, might fairly be taxed?—They are.

2708. But increased?—I should not have any objection to pay an increased tax for my steamer.

2709. What is the tax which you pay at present?—£. 2. 15 s.

2710. And you would not object to pay 4 l.?—No, I do not know that I should, but I think if any alteration is made, it should make a considerable difference between paying at each lock and an annual pass, because payment at each lock is very liable to be evaded.

2711. How is the payment at a lock evaded?—A man may say that he has got a pass, perhaps, when he has not got one; then a lock-keeper may be dishonest, and may not account for all he receives, then it occasions great delay. I came down yesterday from Henley, when the people were returning from the regatta, and there was very great delay at the locks, while the man was collecting the tolls of those who had not got passes. Of course he does not open the gates until he has collected all the money, and if there has been anything going on on the river, I have known boats in the lock more than half an hour while he is collecting the tolls. Therefore, I think you should give those who pay by the year a considerable advantage for the cash paid down, because it facilitates the collection of the income. But yet all those would be very small remedial measures as far as income is concerned; I think the espousal which took place between the upper and lower portions of the river was not concluded by marriage; I would make the union perfect. I cannot conceive that if the River Thames is under the management of one body of men, that there should be any difference in their purse, that is to say, that there should be a right-hand purse and a left-hand purse. If you take the river as one thing to be managed by one body, their income ought to be one and indivisible, and if that remedy were applied, all their financial difficulties, I think, would disappear at once.

2712. The object of this arrangement, I apprehend, was in order to secure the upper part of the river which was the least profitable, from the navigation, leaving weirs and locks better at-

Chairman—continued.

tended to than they otherwise would have been?—I think it was an accident; formerly, the Conservancy of the River Thames from the city stone at Staines down to Yantlet Creek, belonged to the Corporation of London, and in consequence of there being a dispute as to who was entitled to the bed or soil of the river, that was settled in 1857 I think, by a new body of Conservators being appointed, in which some nominees of the Crown, and various public bodies were added, and certain nominees of the corporation. That state of things went on until 1866, I think, when in consequence of the Upper Thames Commissioners having become utterly and hopelessly insolvent, the Board of Trade proposed that they should be united with the lower district, but the union never was made perfect in that respect; they made up their minds that having two bodies to manage the river should be done away with, but they did not complete it by making it one concern, as it ought to have been.

2713. Then you are of opinion that in any future legislation, it should be made one jurisdiction without separation of accounts?—Clearly so, I can see no reason for it; you cannot drop a door across the river and say, "This is a different interest to what it is down below."

2714. Were you solicitor to the corporation in 1857?—No.

2715. But you were in 1866?—Yes; that was when the last Act of the Thames Conservancy was passed.

2716. It was suggested by the Committee of 1863, I think, that the number of the members of the corporation should be diminished, do you think that with the powers of the Conservancy to grapple with the question of floods under those circumstances, and with those increased powers, the corporation would desire still to insist upon retaining so many members upon the Board as seven?—I have no authority to speak for the corporation, but I am quite sure of this, that they would fight to retain the powers which they now possess, because originally, they were to be in a majority of one, I think; then an agitation was got up with regard to the state of the navigation, that it was not properly attended to below, so that in 1864, two members were added to represent the shipping interest; one to represent the passenger steamers, two the lighters and steam-tugs, and one the docks.

2717. The board consisted of 18 before, and now it is 23?—It was only 12 at first, then 18, and then 23.

2718. Is the Lord Mayor able to give much of his attention to this matter?—I fancy that all *ex officio* members very seldom attend to their duties; that is my general experience of *ex officio* members everywhere.

2719. I am looking to the practical working of this board, which, of course, we are bound to consider before all things; I presume that the the Common Councilmen do attend?—Yes, I think so.

2720. But the Lord Mayor and aldermen, having other functions, the Lord Mayor especially, their attendance is not very regular?—I should think that the Lord Mayor, with the multifarious duties he has to perform, does not go very often, but I have no doubt that the two aldermen and the four common councilmen do. But I agree with those who have made some suggestions

*Chairman—continued.*

suggestions to you about the upper river being outbalanced altogether by the lower river. I think, having regard to that which I ventured to suggest to the Committee before with reference to the great importance of keeping the upper part of the river in an efficient state, it is not thoroughly and efficiently represented on the Conservancy, as against the lower part of the river. There are but five representatives of the upper district, one of those is appointed by the Board of Trade, and four are elected by the old commissioners, and certainly as far as those four elected men are concerned, there probably could not be four better representatives. I have not the pleasure of knowing them personally, but first you have Mr. Clutterbuck, the rector of Long Wittenham; then some distance down the river you come to Mr. Hedges, who lives on the banks of the river at Wallingford. Then you come to Mr. Hetherington, who lives at Sonning. Then you have Mr. Vansittart, who lives on the historic site of Bisham Abbey; therefore you have four gentlemen living down the river at very nearly equal distances who are very much interested in the river. If you do not want to increase the Board, I think the number that the Board of Trade nominates to represent the upper district, might well be an elective man; then you will give them one more. I do not see what particular interest the Board of Trade has in nominating a member of the upper district. Then I think you might very fairly give the district between Staines and the western boundary of the metropolis two representatives; that is a district which is not represented at all at present. These elected members represent the district from Staines to Lechlade, but below Staines, from Staines to the western boundary of the metropolis, which I take to be Putney, there are no representatives; and I think if that district were represented by two elected members it would be very desirable.

2721. Would you make the limit the boundary of the Metropolitan Board of Works?—Yes, I call that the metropolis.

2722. And what should be the constituency?—The constituency should be the various urban and rural sanitary authorities. Now we have, fortunately in England, a local authority everywhere; there is either an urban sanitary authority, or a rural sanitary authority, and if you make all the urban and rural sanitary authorities who are on the banks of the river electors, you would probably get two very fair representatives. When you consider that two of the representatives are representatives of the ship-owners, one of the passenger steamers, two of the lighters and steam-tugs, and one of the docks, they have no earthly interest in the upper part of the river beyond Teddington certainly; the passenger steamers in the summer time do come up to Hampton Court, and last summer we had one start, which goes all the way to Oxford in the week, and back again, but their main interest certainly is down below, and that causes some feeling of dissatisfaction on the part of the upper people in not having their wants attended to.

2723. You say that you consider that, as they have already four, and one member of the Board of Trade, one more would be sufficient?—Well,

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*Chairman—continued.*

the highest Conservator that you come to is Mr. Clutterbuck at Long Wittenham, and from Long Wittenham to Lechlade there is no representative of that part of the river; of course, it is nominally represented, but I mean there is no one residing up there; and certainly, if it were probable that the River Thames would be made navigable between Lechlade and Oxford, which one can scarcely say is the case at present, as it is in a most barbarous condition up there, further representation might be desirable. I got up as far as I could, 17 miles above Oxford, where I found only 2 feet of water, and I had to stop. Then the places which you go through there have the old primeval weirs, which are taken to pieces to let you through. One day it may be important to keep up the navigation between the Severn and the Thames, but I defy any trade to be carried on there with any profit now, or for the persons embarking in it to get through these weirs.

2724. What is the draught of your steamer?—Three feet, and it took me all day to do 17 miles; because, as I say, the weirs are taken to pieces to let you go through. There are very few locks above Oxford, but a great many weirs, and the weir is taken to pieces to let you go through; the weir is built up with what they call rimers and paddles; and they actually unbuild it to allow you to go through, whether you are in a steamer, a barge, or a boat; and when the water of the upper part gets nearly on a level with the lower part, you get through in the best way you can. You have to warp yourself through and then the weir is built up behind you, and you have to wait till the water rises again, which is a most barbarous condition of things; it wastes the whole of the water between the two weirs, and makes the space between the two weirs one great lock. There is a canal which was constructed at great cost between Lechlade and the Severn, but, of course, it cannot be used on account of that state of things. It is all very well coming down when you take your water with you, but going up it is a most tedious process. I was told that it takes a barge five days to go 32 miles, from Oxford to Lechlade, and I can quite believe that, as it took me a whole day, with plenty of assistance, to do 17 miles. I think, therefore, that part of the river might well have more representation.

*Mr. Walter.*

2725. I understood you to say that the outfall at Teddington is that which practically controls the flood water of the River Thames?—Clearly.

2726. What is the difference between high-water and low-water level, at Teddington, in summer time?—I should think about 5 or 6 feet the water rises and falls in the lock.

2727. Then what is the fall of the weir?—Of course, that would depend upon whether it is a neap tide or a spring tide. If it is a spring tide the water would be very nearly level; a spring tide, even in summer time, has been known to come over the weir, and make the actual tidal influence felt nearly up to Kingston Bridge.

2728. The question is as to the possibility, or rather the impossibility, of producing any effect upon the channel of the River Thames, regarded from end to end for letting out the water in anticipation

*Mr. Nelson.*

25 June  
1877.



Mr.  
Nelson.  
25 June  
1877.

Mr. *Walter*—continued.

icipation of a flood; you think even if it were possible to let the whole out, it would only make a few hours difference?—I do not think it would make 24 hours difference, because you must always bear in mind that we have not only got to do with the rainfall at the source of the River Thames on the Cotswold Hills, but we have got all the tributaries to think of, and one of those tributaries, the Wey, brings down a very large quantity of water.

2729. Any relief which might be obtained by the towns or country above that part of the river would be purchased at the expense of those below?—It must.

2730. Is it not the fact, as far as your experience goes, that in some localities like Oxford there is an unusual pressure of flood-water, to the very great inconvenience and detriment of those localities?—I think the Port Meadow at Oxford always seems to get its share of the flood rather before other places.

2731. And keeps it longer?—And keeps it longer. The question is, whether these low-lying meadows by the side of our great rivers are not intended by nature to be their safety-valves, because if you do not let the water go over Port Meadow or widen Oxford Bridge, or increase the channel in any shape or way, you must let it down somewhere below, and if you take away these places you will probably flood the villages or towns immediately below them. I will give you an instance of that. Since the last great flood upon the River Thames happened, between Sunbury Lock and Hampton Court Lock, two of the London water companies, the Lambeth Water Company and the Chelsea Water Company, have constructed large impounding reservoirs, in order to take their water out of the River Thames before it is polluted by the Mole, and they have occupied with those reservoirs, which are embanked above the River Thames, a very large surface which the River Thames would otherwise have spread over in this last flood, and the immediate consequence has been that they have had a flood at Sunbury worse this winter than they have ever had before, because that place where the River Thames water would have escaped has been taken away.

2732. Port Meadow, in fact, is a kind of impounding reservoir?—Yes.

2733. There would be no mechanical difficulty, would there, in relieving it by simply lowering Sandford Mill, or making a sluice round it, if it were thought expedient to do so?—It has always struck me that the reason why Port Meadow got the water and retained it, was because the place of discharge at Oxford, under Folly Bridge, was so very narrow. Of course there is nothing that engineers cannot do to relieve one part of the river, and bring the water down the river; but the question is, when you have got it to the bottom of all, whether you will get rid of it there.

Sir *Trevor Lawrence*.

2734. I think an opinion was expressed which is to some extent in opposition to the view you have given that the effect of bringing the water down more rapidly would not be what you think, for this reason, that during floods, as you have stated was the case during spring-tides, the water now flows over the top of Teddington Weir?—Yes, but only very rarely.

Sir *Trevor Lawrence*—continued.

2735. That, I think, was the statement made by Mr. Leech, that during those floods usually the water flowed over the tops of the weir at Teddington, and therefore you were as likely to be injured by a flood coming up with the tide as you were by the water coming down?—No; because you see that when the spring-tide flows over the weir in summer time, there is scarcely any water coming down the river, therefore it only happens for a very short period of the day, and the river is clear then for what water there is to pass away, but the stream of the river in our part of the world in summer time is almost inappreciable; the London water companies are pumping it away and sending it up to London in a subsidiary river underground.

2736. You adhere to that view?—Oh, yes.

2737. I understand that as far as your observations go it is an error to suppose that when the breach took place at Teddington the water fell at Kingston?—It was a most ludicrous mistake, and never had any foundation at all in fact, as it actually went on rising for six days afterwards, as I have told you.

2738. I do not know whether you were in the room at the time, but the town clerk of Kingston stated most distinctly that it fell from one to two feet?—Well, he does not live on the banks of the river, and I do, and I see it every morning and every evening.

2739. I understood that the water came into the market-place at Kingston?—No; the part of Kingston town which goes out towards Surbiton; it was over the road there for some days, but the inconvenience they suffered in Kingston from the floods was occasioned by the River Thames keeping the water in the sewers back; the sewers cannot discharge themselves when there is a flood, and the consequence is that all the water which comes from Kingston Hill and Surbiton Hill cannot get away.

2740. But they have no business to discharge the water into the River Thames at all, have they?—No; but they do, and in point of fact this rainfall last winter was so excessive that the people on Kingston Hill actually had the water in their cellars and places after we had got rid of that down below, for some time, the ground was so saturated.

2741. Is it your opinion, so far as the neighbourhood where you personally live is concerned, that, at all events, the injury done by the flood was very much exaggerated?—Very much exaggerated; they raised more money at Kingston than they knew what to do with, and they have actually invested the surplus of what was raised. We collected something in our own village for the few houses that had got the water in their cellars; there was no difficulty in meeting every claim, and at Teddington there was very little damage done, the principal damage is done to those gentlemen's houses mostly who like to have a residence on the banks of the river, and they go and take a house that has been built in total disregard of the laws of nature, and then a flood comes. All I can suggest to the Committee is, that the sanitary authority should have power to prevent houses being built where they are liable to be flooded.

Mr. *Walter*.

2742. Might not the Conservators put up various marks

Mr. Walter—continued.

marks on the river as a kind of caution?—The conservators do put up flood marks there; they asked me to put up one on my boat-house, and it is there; but notwithstanding that two new houses have been built this winter within a short distance of mine, one of which is let, although, when we have a flood, for certain the tenant will have his kitchen fires put out.

Sir Trevor Lawrence.

2743. When you were at Shifford, were there any number of barges on the river?—Yes, I met a few. It was the year when coal was so very dear, and a very considerable trade was stimulated to bring coal down from Leicestershire, where they have a very peculiar kind of coal which burns like wood for a very long while, and many barges were started to bring that down, but it must be a very profitable trade indeed that can stand the delay of getting down there.

2744. Was that a particularly dry season?—No, I went up at Easter time when we had the advantage of the winter floods.

2745. And there were only 2 feet of water at Shifford?—There were only 2 feet of water at Old Shifford, where they say Alfred held his Parliament, and I was obliged to go back. Of course, these weirs, which have been taken away, would have kept the water up, but they would have been very troublesome to get through.

2746. I suppose it is the office of the keeper of the weir to do this operation which allows the boats to go through?—Yes.

2747. And to put the weir together again?—Yes.

2748. How long does it take?—I should think it takes about a quarter of an hour or 20 minutes to break the weir, and more to put it back again; but you cannot get on, you must wait for the water to rise.

2749. How long does that take?—It depends on the length of the reach; it is a very long process; it took me a day, from about nine in the morning when I left Oxford and the time when I had to give it up at Old Shifford, which was seven o'clock in the evening; I was all that time about it, and I had plenty of people about me. I was quite satisfied that no trade could be carried on there unless it was put in order. I think it is a matter of national interest that that part of the river should be put in order, because you never know when you will want to get through into the Severn.

2750. Are the people at Kingston and the neighbourhood satisfied with the supervision exercised over the river, or do they wish for changes?—There was a good deal of grumbling with the Conservancy as to the state of the river below Teddington Lock; from Teddington Lock to Hammersmith Bridge, practically the river is not navigable at low water, and it would have become almost dry, because the water companies are continually taking more and more water out of the river as London increases. There was a good deal of dissatisfaction about that, which resulted in the Conservators proceeding to dredge it. I think they began two years last Lady-day, and they have got a low-water channel now, down as far as Petersham-lane. I went down quite recently at low water to see if I could get down, and I did. But you cannot get below Richmond; the

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Sir Trevor Lawrence—continued.

dredger has been taken off to do other work, and I have no doubt, until you got past the Conservancy island at Kew, you would be in very considerable trouble if you tried it; and, as there is a great deal of steam navigation on the river now, it is desirable that the tideway of the river should be navigable for those steamers at all times of the tide.

2751. According to the report of the water companies, which we have here, they do not take as much as three-fifths of the water which they are entitled by the Act to take?—Then the river will become a canal, without any flow at all, if you have a warm summer, if they take the whole three-fifths, that I am sure of.

Mr. Hall.

2752. It is quite clear, from what you have said, that the navigation above Oxford, at all events, has been very considerably neglected?—I should say, if I may speak plainly on the subject, that it has scarcely been attended to at all. I do not, of course, know what may have been done, but there are one or two locks; there is the Ousney Lock and the Pinkhill Lock, which have been kept in tolerably decent repair; but as far as taking the shoals out and putting in locks where there were weirs is concerned, that has not been done, but I believe it was from that which prevents so many laudable intentions in this world being carried out, the want of money.

2753. Did you have anything to do with the Act of 1866?—Very little. I knew it was going on, but, of course, the interests of the Corporation in the Conservancy, as far as regards fighting any questions, ceased when the Act of 1857 was passed, when the Conservators were originally appointed.

2754. You cannot speak to it with regard to notices to the landowners, and questions of compensation?—No; it was promoted by the Government, not by the Corporation, and I should know nothing about that.

2755. I think the City of London's jurisdiction formerly extended only to Teddington Lock?—No, to Staines.

2756. But originally it was only as far as the tide flowed, was it not?—No, always to Staines.

2757. Surely an old Act of Henry the 8th gives it only to where the tide "ebbeth and floweth"?—But the tide might have ebbed and flowed up to Staines before there were locks.

2758. What is the history of the City Stone?—That has been the boundary from time immemorial, and it still exists on the banks of the river, with "God preserve the City of London" upon it; it is just above Staines Bridge.

2759. And above that was the jurisdiction of the old Commissioners?—Yes.

2760. The old Commissioners managed the river, and the reason they gave up the management of it was the want of funds?—Their absolute impecuniosity.

2761. That was owing to the railway taking the best part of their traffic, I suppose?—No doubt.

2762. If they had had the command of funds, they would probably have gone on to the present day?—I daresay they would.

2763. Did you ever hear of any clashing of the interests of the Commissioners up to the end of the tideway, and the Commissioners above?—

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Mr. Hall—continued.

That was before my time, I cannot speak to that.

2764. You never heard of anything of the kind?—No.

Sir Charles Russell.

2765. As I understand your evidence, the particular difficulty we have to contend with is, that however much the condition of the river may be improved above Teddington Lock, when we get through, the tide comes into conflict with us, and insuperable difficulties arise?—That is my belief.

2766. Supposing all the shoals about Eel Pie Island, which are, as I know from frequenting the river, very great indeed, were thoroughly dredged away, which would be a costly thing, would it not allow the tide-water at its ebb, to go down much more rapidly than it could possibly do now, would not that be an advantage?—I think you were out of the room when I said these shoals are all happily removed, down as far as Petersham-lane.

2767. How recently have they been removed?—They were commenced two years ago.

2768. But I am speaking of much later than that, I am speaking of the end of last summer, when, I will undertake to say, I could have walked across from the station of boats by Eel Pie Island, until I got to a place nearly opposite, where they land you if you go by the ferry-boat; it would only have been just out of my depth, if it was at all?—From Eel Pie Island to Twickenham you might walk across, but not from Eel Pie Island to the Surrey side.

2769. We are talking of a channel which is to be a water carrier, and we are talking of providing the best means for the efflux of the water; if that was thoroughly done, would it, or would it not be a distinct assistance to the flow of the tidal water?—Every foot of gravel that is

Sir Charles Russell—continued.

dredged out of the river below Teddington Lock, must assist the discharge of the flood.

2770. I am now speaking from my own personal observation; I did not dream of this Committee then, but from my own personal observation it appeared to me that there was an immense area there, that must, in all high waters, become a carrier of water. The only difference is that you cannot get six inches of water over many parts of it, even now?—Yes; but the Conservators did set to work two years ago, to give a navigable channel from Teddington Lock, at all times of the tide, down the river, and they have completed that work as far as Petersham-lane, that is just below the Star and Garter. Then, when you get down below, by the Duke of Buccleugh's place, down to Richmond Bridge, there is tolerably fair water now, but after you get through the railway bridge your difficulties begin, because you could only get up then, after the tide begins to flow, and the water begins to rise.

2771. We know that, at the present time, the Conservators leave undone an immense deal, simply because they have not the money to do what they wish to do. I want to ask you, supposing reasonable expenses are put out of the question, would not the deepening of all those shoals to a considerable depth, say of five or six feet, make a wonderful difference?—No doubt it would. Of course, Teddington Weir, which is one of the last built almost upon the river, is a very powerful weir; it is placed diagonally across the river, so that it can discharge an immense quantity of water; a very much larger quantity of water than it does discharge, simply because the water cannot be carried away.

2772. To sum up what I think is really the important point of your evidence, namely, the extreme difficulty which arises, commencing at Teddington, you think that if the river were deepened to this extent, it would make a much better water carrier than it is at present?—There is no doubt of it.

Lord OTHO FITZGERALD, called in; and Examined.

Lord Otho  
Fitzgerald.

Chairman.

2773. YOU have been acquainted with the River Thames since 1863?—Yes, I have.

2774. And have been in the habit of noticing it in times of floods?—Yes.

2775. What particular part of the river are you best acquainted with?—I have been up nearly every year three or four times from Westminster to Oxford in my steam launch; and when I was in the House of Commons my launch met me every Saturday almost, during the summer, and I generally went 40, 50 or 60 miles up the river, and down on Monday morning.

2776. Then you are able to compare the state of the river in 1866 with what it is now?—Distinctly so. I am quite convinced that the improvement has been very great within the last ten years, especially since it was taken up by the Conservancy Board, who, in former days, only had the lower part of the Thames; but since 1866 there have been very great improvements both in the locks and in the tumbling bays. The tumbling bays are a great advantage in

Chairman—continued.

the floods, but still I think they could be improved.

2777. What improvement would you suggest in the tumbling bays?—I would suggest that sluices might be made in those tumbling bays, which would allow the water to flow more on the level of the bed of the river. At present the water has to rise in those tumbling bays up to its full height, and then it has to flow over the top. I consider if more sluices were put in those tumbling bays, which could be done at not a very large expenditure, the river would then flow very much on its own bed as if there was no weir at all there.

2778. These sluices to be opened only in times of apprehended flood?—In times of excessive floods. I am quite aware that the millowners would not approve of my suggestion, because their chief object is to keep up the head of water, and the water is kept up to a head till the very last minute by the millowners. Of course the Thames Conservancy do not permit the lock-keepers,

*Chairman*—continued.

keepers to open their sluices for that purpose, they are bound to keep the water up for the mill-owners.

2779. The water is obliged to be kept up for the purpose of the navigation and for the mill-owners to a certain height, but do you think that by increasing considerably the width of the tumbling bays that would meet the object we have in view?—No, because when the water rises it rises in my part of the river, between Maidenhead and Windsor, to a considerable extent. It has risen in these last two years 8 feet 4 inches, it rose within half an inch of the same mark last year as in 1875. When it becomes eight feet rise of water in the river I do not believe the mills can work. I am convinced that the navigation cannot proceed; the stream is so immense and the towing-path has three or four feet of water over it, then the river is totally useless either for the purpose of the millowners or for navigation purposes, and all it does is to destroy the crops for miles and miles on the banks, and the depredations it makes are fearful, besides the sickness it causes in the houses which it flows into. In those cases, and in those cases alone, I would make use of some extra gates in these tumbling bays which would allow a large flow of water to go through, and I think would prevent the excess of floods.

2780. Have you been above Oxford in your steamer?—Only a few times; I have been as far as Lechlade.

2781. You are not acquainted with the navigation of the upper river above Oxford?—No, I am not so familiar with it as the lower part.

2782. But up to Oxford you are of opinion that the navigation is very much improved?—I am convinced that it is. The locks have been enormously improved, and everything has been done, as far as I can see, by the Conservancy Board to prevent the floods and to improve the locks and weirs all through. The improvement has been immense in the last four or five years, in fact I wonder, considering the small income of the Conservancy Board, how they have done so much.

2783. Then you seem to be well satisfied with the management of the Thames Conservancy up to the present time?—I am perfectly satisfied with it.

2784. Would you suggest any other jurisdiction than that which at presents exists over the river, or any alteration in that jurisdiction?—I do not think it is quite sufficiently represented as regards the Upper Thames, but I only give that as my opinion. I think if there was another member or two, or perhaps three, on the Board for the upper river, which naturally is the part I take most interest in, it would be advantageous in the event of the landowners being rated.

2785. Are you of opinion that they ought to be represented in some shape or way upon the Board?—Yes, I think they ought; I believe there are already four gentlemen who are representatives.

2786. Do you think the local authorities of such places as Oxford or Windsor should be represented?—I think they ought to be represented.

2787. Do you think that the water companies, as adding so much to the revenue of the Thames Conservancy, should be represented?—No; on

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*Chairman*—continued.

the contrary, I think the water companies ought to be made to contribute much more largely than they do; I think they might well be raised another 1,000 *l.* a year. I believe they pay only 1,000 *l.* a year each at present.

2788. I may inform you that these water companies at present pay 8,000 *l.* a year, and in 1881 that will be increased to 8,500 *l.*; do you think that the water companies ought to contribute further than that?—I think so, most decidedly. If it is compared with the River Lee, you will find that they pay an infinitely less sum on the River Thames than on the River Lee, and I think they could amply afford to pay more. They get large dividends, and they have entirely a monopoly of the thing, which I wish they had not; therefore they can well afford to be raised 50 per cent.

2789. As regards ordinary and excessive floods, have you any suggestion to make to the Committee as to whether any works could be carried out that would diminish ordinary floods, and would grapple with excessive floods?—I think that what I have already stated with reference to the tumbling bays would be the best means of remedying the evil, and really would not be an excessive expenditure. I could not exactly say what it would be, but if the water companies were raised 50 or 100 per cent., I think that would be ample to improve those tumbling bays; about 2,000 *l.* or 3,000 *l.* a year more would go an immense way towards it. The only thing I do not approve of naturally is, that the riparian proprietors, as we are called, should be applied to to put our hands in our pockets.

2790. Are you an owner of land on the river?—I am.

2791. And is your land flooded?—My house fortunately stands very high, 17 or 18 feet above the water, but the lands all round for miles between my place and Windsor Castle have been entirely one sheet of water.

2792. And does that do mischief to your land?—An enormous amount of mischief. If the wheat happens to be sown, naturally the water staying on it, as it has done in the last two years, for something like six weeks at a time, ruins the crop entirely, and it is perfectly useless.

2793. And I believe you have to draw your stock away?—Yes.

2794. And you find the greatest possible inconvenience from the floods?—The greatest possible inconvenience.

2795. Supposing works could be carried out to remove that inconvenience; do you think it reasonable that the landowners should be rated for that purpose?—I do not like to say anything about that. I believe other means might be used first. I think that other means having been used, the landowners are bound to be rated; but I think it is only fair that the water companies, who are really reaping a large profit out of the water of the Thames and do not pay sufficient for it, ought to be rated up to their full value, the same as the other water companies on the River Lee. Then if that is not sufficient, I think it is only reasonable that the riparian proprietors should be rated to a reasonable amount.

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2796. You

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Mr. Walter.

2796. You propose to deal with the excess of water by means of improvements in the tumbling bays?—Yes.

2797. Where do you propose to take the water to that is to be so discharged?—Into the lower level, and so all the way down.

2798. Have you considered the question of the outfall, whether it is really competent to take off this water. Have you considered the state of Teddington Lock in the flood times, so as to be able to form an opinion as to whether it is or is not competent to discharge any additional quantity of water?—I am quite convinced that the present weirs as they are are not sufficient.

2799. I mean at Teddington Lock especially, because that is the outfall?—I really forget at this moment whether there is a tumbling bay there or not.

2800. That is the outfall of the Thames, the tide comes up there?—Yes, it is the first lock.

2801. We were told by the last witness, who resides on the spot, that the state of the water at Teddington Lock is such that the river is not capable of discharging more water, and that any excess of water pouring in there could not be carried off; it would simply flood the country. Have you considered how your scheme would operate upon that?—I am not intimately acquainted with Teddington Lock more than the rest of them. I have passed it many hundreds of times, I suppose, but I have not looked at it with that view. Although the engineer of the Conservancy says I am not quite correct in this, I still hold to my view that the weirs are not down to the level of the bottom of the river. When you come to a weir you have very often got 14 or 15 feet of water, you cannot put a punt pole down, it is so deep, and then the actual sluices or sills are only about four or five feet in depth, and there is a mass of stonework below which prevents a body of water flowing.

2802. Is it not the case, as a matter of fact, that all the water which is discharged down the Thames at flood times, as well as at other times, must find its way over Teddington Lock?—Quite so, but that is no reason why a tumbling bay should not be formed at Teddington Lock.

2803. Supposing the state of the tide is such that no tumbling bay could be made there, which would discharge water, what should you say to that?—Yes, but the tide there is only two hours in the 24; there are only two hours high water there.

2804. In flood time?—In flood time. Perhaps

Mr. Walter—continued.

you are not aware of this, because it is a curious circumstance, that if you leave Westminster at the top of high water, just before the tide turns here, going up in a steam-launch, you run up, and the tide will still follow you right up to Teddington, as it rises for two hours and a half longer up at Teddington Weir than it does here, and then it only rises up four feet. It is up one hour and down the next.

2805. The question is whether at flood times, when the river is extremely high, there is any outfall at Teddington at all which is capable of discharging more water?—It could be perfectly easily made to discharge any amount of water by making a tumbling bay round the lock. Of course it would be some expenditure, but on the towing-path side there are no houses or anything else, and, as far as I recollect, on the weir side; therefore there would be ample means of making a large overflow to take any amount of water. The Thames proper is very broad at Teddington Lock.

2806. But the Committee have been told that in flood times, and even at other times, a high tide will flow considerably over the lock and above the weir at Teddington?—It will, but for a very short time in the 24 hours. It certainly does it, but for such a short time that it is hardly worth thinking of. We do not care about the flood rising for a few hours or a day; what injures us is the flood lying on the land for six weeks at a time, as it does; that is a fearful thing, as it destroys the crops, the ground, and everything else. I believe there is ample space at Teddington to let any amount of water of the Upper Thames go through, with some improvements, as as I have suggested.

Sir Charles Russell.

2807. That is quite in conformity with what the engineer stated; he stated that by making a lip channel, an enormous extra discharge could be got at Teddington?—I was not aware of that statement having been made. There is one more thing which perhaps you might allow me to mention. A suggestion, I know, has been made about cutting up the Conservancy Board, and making an upper and lower Board. I consider that it is of the very greatest importance that the whole thing should be under one body and one head. I think the idea of dividing the board, and having an upper and lower conservancy, would be fatal.

Mr. ROBERT SAMUEL HAWKINS, called in; and further Examined.

Chairman.

Mr.  
Hawkins.

2808. I UNDERSTAND you have brought some Papers to put in, the returns of your meetings, and the number of Commissioners present?—I have a return which shows the number of meetings of the Commissioners since the passing of the Act, as far as 1876, and I have set out opposite to each meeting the number of the Commissioners who were present.

2809. In fact, it is a Paper which we have asked for?—It is a Paper you have asked for.

2810. Will you hand that in?—Yes. I have simply to say with regard to it, that there was

Chairman—continued.

one matter mentioned that referred to Sandford Mill.

2811. I do not think you can go into that matter again?—It was stated that there was no communication; there is a communication.

2812. We cannot go into that matter; you gave full evidence upon it. Then also, I believe, the Commission is desirous of handing in a Paper containing proposals for the better government of your body?—Yes; and there are two accounts which you asked for.

2813. And a copy of the resolutions passed by the

*Chairman—continued.*

the Oxford Local Board?—And a print of the proposals of the Thames Valley Drainage Commissioners, and the resolutions of the Oxford

*Chairman—continued.*

Local Board. (*The Witness handed in the above Papers.*)

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Mr. STEPHEN W. LEACH, re-called; and further Examined.

*Sir Charles Russell.*

2814. ARE you of opinion that if such arrangements as you have pointed out to the Committee for alleviating the floods above Teddington were carried out, that any insuperable block at Teddington would arise?—Certainly not. I stated in my evidence before, that the operations which the Conservators have been carrying on for the last three years were for the object of very largely increasing the capacity of the river below Teddington. Those operations are not yet completed, and, therefore, the effect of them cannot altogether be judged, but we had the best evidence possible, during the last flood, that the flood would have risen three feet higher than it did, had none of those dredging operations been carried out. That shows that a continuance of those operations, which are at present imperfect, would give a very greatly increased capacity for the discharge of floods below Teddington.

2815. And you think if your scheme was carried out above, you could so arrange below Teddington Weir as to dispose of the extra water which you would bring down?—Certainly, I have no doubt at all about it.

*Mr. Walter.*

2816. What do you consider the fall at Teddington at present in flood time?—The fall at flood time is scarcely anything. If you were to stand on Teddington Weir when a high flood is prevailing, you would simply see a rapid stream there, without any fall such as you are in the habit of seeing at the weir generally.

2817. But does not that touch the whole question, as to whether the capacity of Teddington Weir to discharge more water in flood time would or would not be affected by any engineering operations?—No, it rather proves this, that at present time there is not sufficient area below Teddington to carry off the whole of a flood. But what I say is, that the operations which the Conservators now have in hand in deepening that part of the river, will ultimately give all the area that you want. As long as the dredging operations are incomplete, it is quite clear there must be a bar at some point or other, and that is the case at more than one point below Teddington. When those bars are removed, the capacity of the river to take off the floods will be very much increased.

*Sir Charles Russell.*

2818. I understand that you could, if the want of funds did not stop you, carry out a much larger scale of dredging below Teddington than you even contemplate now?—It would be possible, but I do not think it would be necessary. I think, when those operations are completed, the area of the river for the discharging of floods will be very much increased, that it will be in a satisfactory condition, and I do not think more will be required.

*Mr. Cartwright.*

2819. Are those the operations which are stated in the Papers handed in by Sir Frederick O.114.

*Mr. Cartwright—continued.*

Nicolson?—They are referred to there, no doubt.

*Mr. Hall.*

2820. I gather from you that there is a great deal of work to be done below Teddington?—A great deal has been done.

2821. And has to be done?—No, not a very great deal. By far the greater part of it has been done, but there are two or three bars, as I may call them, which have yet to be removed, and when they are removed the result of all that dredging will be much more obvious than it is now.

2822. If, as I understand you to say, the water now at flood time at Teddington Weir is perfectly level, and there is no fall apparent, surely if you are going to obviate that to any extent, there must be very considerable works to be done below Teddington?—No, there are two or three points left similar to bars. We have not yet completed our operations; when those bars are removed, the capacity of the river to discharge floods will be very much greater than it is now.

2823. That is a great work?—Yes, it is.

2824. I suppose the reason you have not done it hitherto, has been the great amount of work which has been done in other parts of the river?—No, we are proceeding steadily on.

2825. Are you working down stream now?—Yes.

2826. Where did you commence?—About half a mile below Teddington, and the space between Teddington Lock and where we commenced is one of those bars which I spoke of.

2827. How long do you anticipate it will be before that work is completed?—It is a matter of only a few months.

*Mr. Walter.*

2828. Do you consider that Kew Bridge and the aits above it at Brentford, have any material influence?—Oh, yes, Kew Bridge is certainly a block; but I think Richmond Bridge is worse than Kew Bridge.

*Mr. Cartwright.*

2829. Did you say that in some few months only you expect to complete it?—Yes.

2830. How long have those works been in course of execution?—Three years.

2831. And you have nearly finished them?—Yes. We are now just about to commence the removal of a shoal a little lower down the river, but which will influence the discharge of floods a great deal.

2832. So that, practically, these works are almost complete?—Yes. That we are just now commencing is in the neighbourhood of Hammersmith; it is a shoal which certainly impedes the discharge of flood water a great deal, and that the Conservators have made arrangements for dredging through.

2833. As regards the action of the river on floods,



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Mr. Cartwright—continued.

floods, if you have expended three years in the execution of these works, and have only a few months to complete it, very little remains to be done?—We have done by far the greater part of the work; there is, comparatively speaking, little to be done.

2834. And, I suppose, what is still to be done would have very little additional influence upon the river?—Oh, yes, it will have a great influence by the removal of these bars which I spoke of.

Mr. Hall.

2835. What will be the fall at Teddington Weir when you have completed this in a few months time; I mean in flood times?—I should

Mr. Hall—continued.

think, judging from what has occurred hitherto, it would not be less, at a time similar to that which I have described when the water is nearly level, than about two feet.

2836. That will be the result of some three months work?—Yes.

Chairman.

2837. Do you consider that if all the works projected are carried out, or similar works, the fears of the people of Kingston that they will be more flooded than they ever have been, are groundless?—Yes.

2838. You have no doubt upon that point?—None at all.

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Friday, 29th June 1877.

## MEMBERS PRESENT :

Mr. Coope.  
Sir Charles Russell.  
Mr. C. Praed.  
Mr. Hall.  
Mr. William Henry Gladstone

Admiral Egerton.  
Mr. Cartwright.  
Sir Trevor Lawrence.  
Mr. Richardson-Gardner.

OCTAVIUS EDWARD COOPE, Esq., IN THE CHAIR.

Sir FREDERIC NICOLSON, Bart., C.B., recalled ; and further Examined.

Chairman.

2839. I THINK you have some other return you wish to put in?—I have brought a return which I think will make clearer those questions with regard to the votes and voters of the various representatives. It shows how they go out by rotation ; I do not suppose you will care to know what each of these bodies contribute. It is given in my evidence, but I think that shows it more clearly.

Mr. Cartwright.

2840. I think you have given a distinct opinion that it would not be desirable to increase the number of your Board?—I think not, if it could possibly be avoided ; the Board is now sufficiently numerous.

2841. And do you think that the interests that are connected with the Thames Valley are all sufficiently represented on the Board as it is at present constituted?—Oh, yes.

2842. I think you have stated that there are four members of the Conservancy whom you consider to be returned by the riparian interests, and who adequately represent all the interests also on the upper part of the river?—The constituency that returns these four members is so very peculiar that I should not undertake to say that they adequately represent every one. It is a very peculiar constituency, as I daresay you are aware ; but I think, considering who these gentlemen are, and the manner of their election, there are upwards of a thousand voters, if I remember rightly, I think they do fairly represent that part of the river.

2843. I think you were of a distinct opinion that the four representative members are representative members who adequately represent the interests of the upper district?—I think so, although the constituency, as I said before, is a very peculiar one.

2844. Although the constituency is not a constituency which is limited, or is constituted only of those interests which are connected with the upper river?—No ; I think, if you look at the last part of the details of the constituency, you will see that it includes nearly all the landowners on that part of the river.

2845. Not only the landowners of that part of the river, but those also who are on the lower

Mr. Cartwright—continued.

river?—There are a few ; the Lord Mayor and Aldermen, for instance, but, as I understand it, the last paragraph is limited to the counties of Wilts, Gloucester, Oxford, Berks, and Bucks, within five miles of the River Thames. Any person holding in his own right, or of his wife, freehold or copyhold worth 100 *l.* a year, or being the heir-apparent of some person having such estate of the clear yearly value of 200 *l.*, every person who does that, and shall reside in either of the said counties, being seised of the value of 100 *l.* a year in Great Britain, or being the heir-apparent of some person having such estate of the yearly value of 200 *l.*, or holder of navigation bonds of 500 *l.* It was so extremely inconvenient, persons all over these counties of Gloucestershire and Wiltshire voting, that this qualification was limited to within five miles of the River Thames by the Act of 1870.

2846. As a matter of fact the elections are merely nominal elections, are they not?—I forget whether it was at the first or not, but there was a very sharp contest. I was not then, as I am now, the returning officer, and elections are so far nominal that each candidate goes out in rotation ; and if the persons who are electors, like some members of the Committee, take no pains either to vote or to bring forward another candidate, of course the outgoing member is re-elected.

2847. But is any intimation sent forth that there is to be an election?—It is all provided for by the Act.

2848. We have never received intimation, although there are electors here?—I can tell you exactly the form ; there are certain publications in newspapers, and I can give you the whole story. Section 19, Act 1866, is : "Where the Conservators are by this Act required to publish any notice respecting elections, they shall do so by inserting the same as an advertisement once in each of two successive weeks in some daily morning newspaper published in London or Middlesex, and once in each of the same weeks in some newspaper published in the county of Berks ; and the publication shall be deemed to be completed on the day on which the second advertisement in the last-mentioned newspaper appears." I need hardly tell the Committee that as the deputy chairman of our board is *ex-officio* the returning officer,

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officer, it is my duty, at each election, to see that all these requirements are complied with.

2849. In 1866, I believe, the first election took place?—Yes.

2850. Since 1866 has there been any change, and what number of changes have there been, in the representation?—The only change, I think, in that part of the river was when Colonel Harcourt retired, and Mr. Vansittart was elected in his place; but there have been three contests, including the first election.

2851. You say there were three polls taken?—At three different times.

2852. Could you give me the dates?—I am very sorry I cannot; if I had known you were going to ask me, I would have had it all correctly; but the gentleman who assisted our late chairman is in the room, and I daresay he can tell you the exact dates.

2853. Still, as a matter of fact, the election generally takes place, and there is no great public attention drawn to the election of these representatives?—The Conservators do all that is required of them by Act of Parliament to draw public attention. If the persons on the upper river who are qualified take no interest in it, and do not bring forward a candidate, of course the outgoing member is re-elected.

2854. And generally is re-elected?—If there is no opposition, he must be.

2855. There was one point that I did not quite understand about your evidence in regard to the payments which were made by the water companies. I think, if you look to Question 2435, you say that you received from the water companies 6,550 *l.*?—Yes, that is paid to the Upper Fund.

2856. On looking to your accounts, of which I have a copy, this is "Thames Conservancy Account, ending the 31st December 1875;" I see that on the Upper Navigation Account you enter only 6,100 *l.* of cash contributions from the water companies?—I have no doubt the explanation is this: our accounts are made up to the last day of the year, and there may have been some little delay in the payment; I cannot at the moment tell you, but I think that is probably the reason.

2857. Does the difference appear anywhere on this account; is it intended for anywhere else?—The accounts which we present to Parliament are made up to that date. If by any accident there may have been a delay in the payment, and I am only supposing that is the probable explanation, then, of course, it would not appear in that year; it would come in the next.

2858. Will you kindly look into that, and give us a statement as to that discrepancy?—Our accountant informs me that the East London contribution was not increased until after that date, which will account for it.

2859. Is not the East London only 50 *l.*?—It was increased after December 1875.

2860. The East London Water Company you say, in 1867, paid 1,000 *l.* more; that would make it 7,100 *l.*, if there was an additional 1,000 *l.*?—My evidence is quite correct with regard to it.

2861. No doubt; but I was only drawing your attention to the discrepancies?—I wish to state generally to the Committee, that if they find any of these small discrepancies in the accounts, it arises most probably from some delay, and in this particular case that company had not begun to pay.

Mr. Cartwright—continued.

You see that is a year and a half ago; my statement is up to the present time.

2862. You credited the East London Water Company with an additional payment of 1,000 *l.* in this answer; I see the principle: suppose that this is a statement prior to this increased contribution, you credit yourselves with the receipt of only 6,100 *l.*, and 1,000 *l.* more would make it 7,100 *l.*?—In 1866 they started by paying 1,000 *l.* each, 5,000 *l.* In 1867 the East London paid 1,000 *l.* more, which brings it up to 6,000 *l.* In 1876 the East London paid 500 *l.* more, and that 500 *l.* would not appear in the account of 1875.

2863. You have given some evidence as to your opinion that the water companies might fairly be asked to increase their contribution to the Conservancy, on the ground that you have further improved the water-supply, and that as the population of London increases the consumption of water increases?—Yes.

2864. Would there be any foundation for that claim, seeing that you admit that although, when the basis of the contribution was originally settled in 1865, it was settled upon the basis that they should have 110,000,000 gallons daily, yet it appears that they did not consume even that amount, but only 60,000,000 gallons daily?—The 110,000,000, I think, was fixed long before that; that rather strengthens perhaps your case, but I still remain of opinion that there is no more equitable source of a certain amount of income.

2865. You do not base your claim upon the ground that they are consuming now a greater amount of water, or drawing a greater supply of water from you, than they did some number of years ago?—No; I think, in one of my answers, I stated that if this Committee were prepared to recommend that the water companies should contribute at so much per gallon, I think the Conservators would be only too glad that it should be done.

2866. You have thrown out the idea that you want to mulct the water companies?—I do not call it mulcting; I call it a contribution to a great national object, for benefits they have received.

2867. It is not that you would rest the claim on the fact that they are now drawing from you a greater amount of water than when the original settlement was made?—Pardon me; they certainly do draw more water, although they have not reached their limit of 110,000,000 gallons, which they were entitled to take.

2868. What was the limit which was contemplated when the arrangement, was made for the payment?—I really do not know whether the Committee of that day went so nicely into the question or not; there is no doubt they are entitled to take up to 110,000,000 gallons.

2869. In your answer to Question 2482, quite towards the end, you refer to delays on the part of the Thames Valley Drainage Commissioners which have caused you inconvenience; can you state, in any detail at all, what you refer to?—Mr. Leach, our engineer, has already, I think, explained that.

2870. What the nature of the inconvenience was, I mean?—I think Mr. Leach put it very clearly. He said it would not have done for us to execute substantial works in the part of the river with which the Thames Valley Drainage Commissioners are concerned, lest it should be found

Mr. Cartwright—continued.

found afterwards that these works were not such as to fit in with the works which we hope that the Thames Valley Drainage Commissioners will some day or other be prepared to execute.

2871. Had you any large schemes which were at all crossed?—No, I do not think it was anything large; it is a thing which Mr. Leech can answer better than I can, but you will see in his evidence that he alludes to that, that we stayed our hand. In judging of the best part of the river upon which to spend our limited funds, under his advice, we said, "We, at any rate, will wait for a time with regard to this part of the river, until we see what the Thames Valley Drainage Commissioners are prepared to do."

2872. Then, in fact, you postponed the consideration of the question?—We postponed the execution of any works.

2873. We have heard a good deal with regard to the weirs; you distinctly admit, I think, that the whole responsibility of the management and of the regulation, with respect to the weirs, rest with the Conservancy?—Oh, yes.

2874. It is a matter of notoriety, I think, that there is a dissatisfaction on the part of many landowners with the state of these weirs. I will now refer you to your answer to Question 2483, in which you say that you have very large powers given you, under the supervision of Parliament, to whom you report annually, and of course persons aggrieved have their remedy by process of law. Is not that a very costly and a very uncertain process?—Yes. I am not prepared to say what the remedy may be, but I do not think you have heard other evidence which I have given which bears on this point, that for 20 years we have been exercising these very powers without any reference to the Board of Trade or anybody whatever, all over the river, and I should like to state to the Committee that in each Session of Parliament we have obtained clauses in Bills on new works affecting the river, continuing those powers, and, if I may say so, extending them. My argument is, that if we for 20 years have exercised those large powers, as we think fairly, and it would almost seem that they must have been fairly exercised, otherwise Parliament would hardly have continued those large powers to us. But what is peculiar in this part of the business is, that in the Act of 1866 a clause was introduced, which is section 54, and perhaps I had better read it, as it is very short: "If in any case where the consent of the Conservators is requisite for our purpose under the Land Drainage Act, 1861, as affecting the Thames above the City of Oxford, such consent is not given within two months after the same is applied for, the body or person desiring to obtain such consent may apply to the Board of Trade, who shall direct whether or not such consent is to be given and if so, on what terms or conditions, and the Conservators shall follow the directions of the Board of Trade." What I wish to impress upon the Committee is this, that throughout the whole of the River Thames, for 20 years, that supervision with regard to the Board of Trade has not existed; we constantly consider applications for new works in a most elaborate manner, and we can withhold our consent to them without any reference whatever. I think if that has been exercised in a proper manner for 20 years, it is not quite fair to assume that it will not be exercised in the upper district, where they have a reference to the

Mr. Cortwright—continued.

Board of Trade if the Conservators are unreasonable or arbitrary.

2875. But is not the condition of the upper river very different from the condition of the lower river. I mean, are not the interests very different?—No, because the limits of the Thames Valley Drainage Commissioners come down to Clifton Hampden so that all the lower part of the river, at any rate down to Teddington, is precisely in the same condition.

2876. I suppose the lower river is very much more under your personal inspection than the upper river?—Of course we inspect the upper river, certainly not quite so often, but we do inspect it frequently. It is not long since we had a trip, and a very cold trip it was, from Cricklade down to Oxford; we have been very recently down to Goring, and we shall very shortly inspect the condition of the river from Oxford to Goring again.

2877. In the last 10 years, if it is not an impertinent question, how often have you been up to Oxford?—I should have to refer to our books for that; but I should think, if I may take the part below Goring, that is visited four or five times a year at least.

2878. By whom?—By the Conservators, and besides our engineer's visits and our superintendent's visits.

2879. Personally, how often have you been to Oxford in the last 10 years?—I could not tell you off hand, but our general rule is this: that two bodies of Conservators go there twice a year; that is to say, we make two visits in two detachments.

2880. To Oxford?—But, I must add to that, you must remember that these are mere formal visits, and if there was anything special to look to we should, of course, go there as we should to any other part of the river.

2881. It is part of your ordinary routine to go twice a year to Oxford?—Certainly.

2882. And you have done so for the last 10 years since 1866?—Yes.

2883. Every year?—And perhaps oftener. I am only speaking from recollection, but if you make our body more cumbrous, this sort of inspection will become still more difficult.

2884. There was a question asked by a member of the Committee as to Sandford Mill, whether that had not been burned down. I believe you said you had tried to get rid of the weir at Sandford?—No, I did not say we had tried to get rid of the weir. I think what I said was this, that if Messrs. Leach and Beardmore's scheme had been carried out, many of the disadvantages of that weir would have been obviated.

2885. Did not you receive any communication from the Thames Valley Drainage Commissioners with reference to that weir at that time?—No.

2886. None at all?—No, I think I may safely say we have searched all our records, and I have read the only two communications that have passed between us; I have no recollection of any other. I should like to be quite accurate, and our engineer informs me that there was a communication which, I think, very probably came through his department, and may not have got into our secretarial department. He says it was a very small matter which related to the lowering of the sill of the mill there.

2887. If you did take any steps to remove that it was in consequence of the representations of

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the Thames Valley Drainage Commissioners?—I should like to look it up before I give a positive answer. We have endeavoured to find every document connected with them, and that is all we have been able to find.

2888. There is a bridge at Wolvercote which was, I believe, rebuilt last year?—Above Oxford; is it on the river?

2889. Yes, I believe it is, but I may be wrong?—It is a question which Mr. Leach would answer off-hand. Last year you say?

2890. Yes; but I am speaking under correction?—I do not see it in our report, unless it goes by some different name, as they sometimes do. Here is a statement of the bridges built, which was drawn up in February.

2891. When you execute works upon weirs, and so forth, do you advertise for tenders, or how do you execute your works?—Generally speaking, they are done by our own staff; we have occasionally, I think, had tenders for iron bridges, but, as a rule, the work is done by our own staff, I think.

2892. The masonry of the locks, and so on, is generally done by your own workmen?—Yes.

2893. Under the inspection of your engineer?—Oh, yes.

2894. Therefore, such works might be considered to be works for which you take the very best guarantee for their proper execution?—Yes.

2895. I observe here that you rebuilt from end to end Boulter's Weir; that, I suppose, was done by your own people?—Boulter's Weir stands on a very uncomfortable gravelly soil; I believe it is one of the most troublesome locks we have, with regard to the springs of water, on the river.

2896. What I am referring to is at page 3 of your accounts for the year ending 31st December 1871?—I have not got that before me.

2897. "Boulter's Weir has been reconstructed from end to end, and the tumbling-bay has been rebuilt in the most substantial manner"; you emphasize that. Now, I observe that afterwards, in the account which you rendered in 1877, you say a large portion of the weir has given way, so that it has to be renewed. Was that done by your people?—I am sorry to appear in the least ignorant, but Mr. Leach could give you these answers far better than I can; I know this much, that Boulter's Lock, as regards the sides of it, as far as I recollect, was fairly substantial.

2898. It was rebuilt by your own men?—Quite so; I am delighted that you have looked so carefully into our annual reports, which I am afraid very few people do.

2899. You said something about rating powers, and you thought they might possibly be given you over the land adjoining, and bordering on the river?—Where have I said that?

2900. You refer to it amongst the difficulties?—Very well, we will assume that it is one of the possible sources of income.

2901. With your experience of all that passed on the former occasion, do you think that there is any probability that the landowners on the banks of the upper river would be willing to agree to such rating powers as they fought against on the former occasion?—The gentlemen who obliged us to remove our clauses in that Bill which we have heard so much of were confined to one small district of the river above Oxford. It

Mr. Cartwright—continued.

is quite possible that the gentlemen who reside lower down might take a larger view of the matter, and may not object to the rating powers. I have already stated in evidence that if we are to derive a very large income from rating powers, some addition, though we hope a very small one, may be required to be made to the four representative members of the upper district. But I suppose a change in that peculiar constituency would be one of the necessary elements of the question, if you are to add a few to them making them more than four; but then there must be a large revenue derivable from rating; I could hardly suppose that the landowners would object to be rated if benefits are to accrue to them; but you see some of them say there is no benefit in preventing the floods coming on their land, and besides that, placards have been sent to our office from Oxford about rating. But rating is not the thing which I wish to be put forward prominently; I think the key to the problem lies with the water companies.

2902. You want to mulct them?—I did not use that word.

2903. You said placards have appeared?—There has been a public meeting since this Committee has been sitting, at Oxford, and of course we got sent to us, I do not know by whom, huge placards, calling upon the ratepayers in those parts to resist being rated for the improvement of the river. I say if you come to the question of rating, you will have a very difficult problem to arrange, and you will, no doubt, find two sides to the question. Some may be willing to be rated; others, again, may be very unwilling, and I think those who are unwilling will probably preponderate.

2904. And those who are unwilling, if I am not mistaken, really do represent very large interests in the Upper Valley; I mean those who opposed your Bill?—Unquestionably, the gentlemen who opposed us on that occasion were the largest landowners in that part of the district, but I still think, although it is now a thing of the past, that if, as I said before, we had been better negotiators, that that Bill would still have passed in a modified form.

2905. What do you mean by being better negotiators?—It is a very long story.

2906. But it is a very important point with reference to the question of the popularity of the Conservancy?—There was a meeting at Oxford, and it happened from various causes hardly any of our members were able to attend; that is what I call being bad negotiators, not going to this meeting; I think only two members attended. Then, again, instead of ascertaining the feeling of the landowners in the district before giving the requisite Parliamentary notices, we gave the Parliamentary notices expecting them to be able to come to amicable terms. I think there we were mistaken, but we based the preparation of these clauses chiefly upon the communications which I have handed in from certain authorities at Oxford, who suggested we should get rating powers to rate the landowners.

2907. I suppose you will admit that, in the upper river, on the part of those who have riparian interests, there is a very considerable feeling of opposition to the present constitution of your Board?—I have heard certain evidence to that effect in this room, but I have no other knowledge of it whatever; in fact, I was surprised to find

Mr. Cartwright—continued.

find that the Thames Valley Drainage Commissioners had any feelings of hostility.

2908. I am not speaking about the Thames Valley Drainage Commissioners, but of the riparian interests?—I have no means of ascertaining that.

2909. It was the riparian interests who fought you?—I did not understand that, and I should say certainly not the riparian interests generally, as far as I know; I do not know whether it is worth mentioning, but some of them subscribed and gave our superintendent a testimonial, which does not look at all as if they disliked the action of the Thames Conservancy.

2910. But still they fought your Bill when you came for rating powers?—Pardon me, no; the rating clauses were withdrawn, and the persons who caused us to withdraw them were almost exclusively confined to those above Oxford and near Oxford.

2911. Yes, but that is a very important section of the upper river?—Well, I think all the river is important.

2912. When the Conservancy Board was constituted you found a very considerable debt?—You mean when we took over this district.

2913. No; in 1857?—Yes, there was a debt.

2914. Of about 88,000 £, which you took over?—I think we are confusing two things: you are speaking exclusively of the district above Staines, which was transferred to us in 1866; upon that district there is now a debt of 88,400 £.

2915. You mean in 1866?—Yes, we took that over from the Commissioners.

2916. Upon that, no interest has ever been paid?—I have already stated that.

2917. That debt has been further increased since, under your management, has it not?—The debt upon that part of the river has certainly been increased, because otherwise the whole navigation would have been stopped long ago.

2918. What is the amount of increase; about 40,000 £, is it not?—Yes, of that 6,000 £. has been repaid, and to that you must add at least 10,000 £. borrowed from the lower fund.

2919. The old Thames Commissioners I believe worked gratuitously; they received no remuneration?—I believe not; but as they did nothing, I do not think they deserved anything.

2920. That is not the case with the present Board?—No; the position of the Conservators is this: from the lower fund they receive 1,800 £. a year, and from the upper fund 700 £. a year; making a total of 2,500 £.

2921. That 700 £. which is now drawn by the Conservators is a sum which was not drawn by the old Thames Commissioners. Of course you inherited the debt of 88,000 £., and you have added a debt of 40,000 £., and you draw 700 £. a year?—Yes. Do the Committee wish me to give any explanation with regard to the 2,500 £. which is paid to the Conservators, because I am quite ready to give you all the details.

2922. I merely wish to know whether I am correct; I believe that is the case?—Quite so.

2923. I think the income of the upper navigation has been stated to be 10,000 £. a year from various sources?—Yes, it is about that now.

2924. Then practically it comes to this, that about 8 per cent. of the sum on the upper river is drawn by the Conservators for their salary?—It may be so; I have not calculated it in a percentage form.

0.114.

Mr. W. H. Gladstone.

2925. I believe you profess to provide a draught of 3 feet 10 inches in all parts of the river?—I do not know what we profess to do; I know we do provide that draught, but there is a curious old Act which rather limits it, I think.

2926. Do you consider it one of your objects to increase that depth still further by dredging?—Certainly, in the original report; and I wish to distinguish it from the report simply upon the river near Oxford; in the original report made by Messrs. Leach and Beardmore, I think the provision from Oxford downwards was to get a depth if possible of 6 feet, and many of the locks have been lowered with that object.

2927. Dredging is the chief thing you would undertake if you had the funds, with the view of controlling the floods?—That certainly would be one great element, and opening out the tumbling bays.

2928. Whatever the depth of the river, would it not be necessary to lower all the sills?—Of course it would be no use to make the river all 6 feet, and to have all the sills of less depth.

2929. Do you agree at all with Mr. Rawlinson in thinking that embanking is the proper way of meeting the difficulty?—It might be presumptuous of me to give an adverse opinion to that of Mr. Rawlinson, but I think from all that I have heard here, and all I have heard elsewhere, that embanking is not the most desirable way.

2930. I think you said the 20,000 £. was required for putting the river in proper order?—That means, completing the present locks and weirs which are still in a dilapidated state. I do not think it includes any dredging.

2931. And after you have spent that money, can you estimate at all what the actual expense will be?—No; but I am very confident that after we have spent that, provided the income remains about what it is, we shall have no occasion to borrow unless we have to execute large works of any kind with regard to mitigating floods, but I mean for the ordinary maintenance of the river and a fair amount of dredging after that is spent, we shall get on very fairly, so as each year to repay so much of the capital borrowed, for I should like to add to the answer I gave just now, that year by year we repay so much of the capital borrowed.

2932. I think some few years ago you reduced some of the tolls for pleasure boats?—I should like to explain that. We tried reducing the barge tolls some short time back, and we thought and hoped that we should get more traffic by it, but I am sorry to say we did not. With regard to the pleasure tolls, the tariff was fixed by a Committee of the House of Commons, and it certainly is not a satisfactory one. It reduced the tolls for the smaller pleasure boats on the upper river from 6 *d.* to 3 *d.*, and I do not know that we can ever raise them again; but the whole tariff requires revision. There is no doubt that the annual through tickets are a great deal too low, especially for steam launches.

2933. How has the change affected your revenue?—The pleasure-boat receipts have increased, but only for this reason, that a great many more boats, steam launches, and so on, are on the river. If the number of boats had remained the same, there would have been a considerable diminution in the receipts.

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2934. You

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Bart., C.B.

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Mr. Hall.

2934. You have no doubt seen this petition which was handed in by the principal landowners of Oxfordshire against your proposal to rate them some time ago?—I daresay I have, but I have not looked at it for many years.

2935. You are aware at that time they showed a considerable feeling against the Conservancy Board's proposals of rating?—Oh, dear, yes.

2936. You mentioned something about certain placards which had been sent to your office; what did you refer to. I do not think there have been any public meetings in Oxford to protest against rating them there?—What I meant to say was this, that a few days ago there was a meeting held, I forget whether it was public, but it had something to do with the action of the Thames Valley Drainage Commissioners, and with reference to the future management of the river, and this placard I am referring to was sent by an individual ratepayer calling upon his fellow ratepayers to oppose the proposals at that meeting. I merely mention it to show that all people are not agreed as to being rated.

2937. Is it not possible that they object, not so much to the rating as to the body who will rate them?—That is possible certainly.

2938. You said that you were not aware until you came into this room that there was any antagonism between the Drainage Commissioners and the Thames Conservancy Board?—Yes.

2939. Have you not been informed that a meeting waited on the Home Secretary, and brought forward several things, showing what the feeling was as regards the Thames Conservancy?—Yes, but this meeting did not appear to be confined to the Thames Valley Drainage Commissioners; it appeared to me that a great many persons at this meeting were persons connected with the river who had suffered from floods, the object being to show that we were an obstructive board, who, I will not say caused the floods, but did not take proper measures to mitigate them.

2940. You said, just now, that you had stayed your hand in the doing of certain works, owing to some doubt as to the action which would be taken by the Drainage Commissioners. Now there have been a great many works above Day's Lock that you have done without consulting the Drainage Commissioners, have there not?—Yes, but those were some special works above Oxford, and Mr. Leach can explain them.

2941. I think he has already given evidence to that effect, but what I want to know is this; there have been several works done by your Board without thinking it necessary to consult the Drainage Commissioners at all, have there not?—It was not a question of consulting, but I think it must be obvious that if the Drainage Commissioners had had a plan of the works prepared, we should have been in a far better position to judge whether any works which we wanted to do would fit in with theirs, so that we should have been better able to judge what was best to be done on that part of the river had we any plans of proposed works from them before us.

2942. Now in these visits which you say you paid to Oxford periodically, has it been your habit to let the Drainage Commissioners know you were coming to give them an opportunity of taking counsel with you in any way?—No; we never have done so, but we have met occasionally various bodies. I remember on one occasion we

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met the mayor and corporation of Oxford at a place called the Four Streams; of course when there is any object in seeing anyone we always do it. Our engineer and myself had a long interview one day in our boat with two of the farmers above Oxford. I hope the Committee do not think we wish to stand aloof from consulting anyone.

2943. Your principal hope, you say, is in the water companies, and you have your claim upon the fact that by looking after the navigation you improve the water supply; now, I want to know whether you have done much towards improving the navigation above Oxford?—We have done more than many people suppose, but the navigation above Oxford does not improve; the Thames and Severn Canal is in a very bad condition; it takes a quantity of our water to stop its leakage; upon one occasion Mr. Campbell of Buscot a few years ago spent some money there, and we spent some money there, and we were in great hopes something would come from it, but really everything we spent there, as far as navigation goes, seems to be money thrown away. We have lately ordered an expenditure of 400*l.* there to dredge away some shoals which have been accumulated by the late floods, and as far as we can see at present there seems very little prospect of any navigation cropping up there.

2944. You spent a great deal of money at Godstow?—Yes, we rebuilt the lock.

2945. But are you aware that the approach to Godstow lock is completely stopped up by weeds, and so on?—From above or below?

2946. From above, I think?—No, I think not.

2947. I am afraid that on your next trip you will find that it is so?—Well, I was there a short time ago.

2948. Did you manage to get through Godstow lock?—Yes, I think so.

2949. Have you seen Messrs. Falkner's and Tanqueray's Report upon that subject?—No; I should like to tell the Committee that this Report, which was mentioned in Mr. Hawkins' evidence, was a report made to the Thames Valley Drainage Commissioners, and we have never seen it. There may be something in that Report which might perhaps have altered the first communication which was made to them with regard to all these accounts. I have heard of that Report, but I understand from a gentleman who knows the operations of these Commissioners that it was a private Report to them, and was never acted upon.

2950. At Medley lock you spent money?—Yes, I think we have.

2951. Is it true that at that lock the old system of paddles has been preserved?—Medley, I came through the other day, and it was all open, I think. I am quite ready to admit that we could make great improvements in that part of the river, and perhaps should have spent more if we had more money, but when you have so very little money, and when you have such important works as Marlow Weir, Bell Weir, and others, threatening to fall into the river, we naturally looked upon that part of the river as more important. For instance, at King's Weir, I daresay a lock would be a great improvement; and even to go to a small matter, we should long ago have put a boat slide there, as we have done at Sunbury, and at other locks (because I have a particular fancy for these boat slides), but it was simply a question of money; it

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it would have cost 300 *l.*, or something like that, and we thought that we ought not to spend it.

2952. Are you aware that what is stated against you is not that you have not spent enough money, but that what has been spent has not been well spent?—That I cannot admit. I think if the Committee have any doubt, the best plan will be to get some independent engineer of high position to examine our works from end to end, and state whether the money that we have spent has not been very judiciously spent. We have great confidence in Mr. Leach, our engineer. The first lock we took in hand was Bell Weir. The Committee of 1866 were so anxious that the navigation should not be stopped, that they asked us to take Bell Weir in hand before they would report, which we did; and although, of course, it is not easy to compare the expenditure between different locks, I cannot help thinking that our later locks are as efficient as need be, and I think Mr. Leach has been able to reconstruct them at a less cost than usual. Therefore I maintain, as far as I may give an opinion on engineering matters, that the money has not been wasted.

2953. You are aware that Mr. Bryan Wood has given evidence that the removal of the weirs above Oxford has rather done injury to the navigation and landowners than benefitted them?—Some landowners were delighted to see them removed; they were miserable stumps and sticks, and a great obstruction, and caused floods. In fact, all the weirs at that part are built on a wrong principle; they have large abutments into the river, and contract the river, and of course cause floods.

2954. Which abutments are not yet taken away?—Some of them are there still, I am sorry to say.

2955. With regard to the financial statement, you put in a statement which shows that in 10 years of the upper navigation from Lechlade the income has been 11,209 *l.*, and you have spent about 60,000 *l.* which is very liberal; but I want to know how it is that all the water companies' money is expended below Day's Lock?—It is not expended there specially. 'The water companies' money forms part of our general fund. If we had not the water companies' money we could not pay the interest on the monies we have borrowed. I hope you will not suppose that the water companies' money is specially appropriated to one district; it extends from Staines up to Cricklade. Then there is the interest and the repayment of capital, so much each year and the general expenses which stand of course on the credit side of the account for the whole system.

2956. Ought not a fair proportion of that to have been put down on the credit side for the 55 miles between Lechlade and Day's Lock; you have only given credit for an income of 11,209 *l.*?—I have not a copy of that account, but I think you will find that is simply an abstract of certain questions asked. Our regular accounts will show something different. This was simply an abstract of those questions which have been asked us by the Committee with respect to that particular district; it was merely a comparison of the receipts of that particular district, with the expenditure of that district. It is not a return we put in, but it is rather an abstract of those numerous returns which have been asked for by the Committee, with reference to that particular district.

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2957. I quite understand that; I suppose the whole of the money received from the water companies in 10 years may be roundly put at 65,000 *l.*?—I have not added it up.

2958. There or thereabouts?—Perhaps so.

2959. If you had taken a fair proportion of this, and put it to the credit side of this account. If you had taken a fair proportion of these water-works companies' money, and had put it to the income of this particular navigation between Lechlade and Day's Lock, then you would have had a total expenditure of 25,000 *l.*, as you have now, but instead of having only an income of 11,000 *l.*, you would have had an income of 40,000 *l.*, which would have made a very material difference?—Excuse me, if you are going into that, I must make this simple statement. You must, on the other side, put the proportion of the interest, and the proportion of the capital repaid, and you must also add to that superintendence, salaries, and so on.

2960. You have 700 *l.* a-year, as you say?—I am speaking of this particular statement; you asked me why we do not, on the one side, take a proportion of the water companies' money, and add it to the receipts; my answer is, if you do that you must, on the other side, take the proportion of all the expenditure upon the other items not specially connected with this district. As I have told the Committee before, the services of the whole of our staff, from end to end, are given to the whole upper district without a charge of sixpence.

2961. Except the 700 *l.* a-year?—Except the 700 *l.* a-year.

2962. And except also the great difference between the value of the tolls below Day's Lock, between Day's Lock, and Staines, and Day's Lock and Lechlade, which is nearly three times as great; I see the tolls are 1,100 *l.* a-year from Lechlade to Day's Lock, and 2,800 *l.* a-year from Day's Lock to Staines?—Yes, but you must consider that the tolls at Osney are through tolls. It is extremely difficult to make these sort of accounts applying to one particular district appear accurate. If, instead of applying your attention to that, you will look at our general statement of accounts up to the end of 1876, I think you will find it is all very equally distributed.

2963. But, at all events, you will admit that money payable by the water companies is payable on accounts which are applicable to the whole river?—Quite so.

2964. Then, *prima facie*, this part of the river would be entitled to its share of the income from the water companies?—Quite so; and, on the other hand, it should bear its share of the expenditure.

2965. You do not show a large sum as there should be for 58 miles' proportion out of 116 miles; those are the distances?—If you will excuse me, I do not think it is quite fair to divide it by distance. From 40 miles above Oxford down to Lechlade first, there has never been any navigation; it is a mere boating stream; and, besides that, the traffic is nil; therefore, I do not think it is quite fair to divide the river in that way; it hardly gives a fair idea.

2966. Then with regard to the expenditure, there is also a great discrepancy, is there not; the total expenditure on the whole account is 153,000 *l.*, as I observe by your figures?—That is for the 10 years.

2967. But upon this portion from Lechlade to Day's

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Day's Lock; the money spent by you is only 25,000 *l.*; that is surely a very small proportion of the whole for so important a part of the river?—Quite so; but, as I have just said, the expenditure upon that particular portion is limited to certain operations, and 153,000 *l.* of course includes our grand total, including our staff, and so on. Whereas the expenditure, as stated here, the 25,000 *l.*, is simply cash expended on locks and weirs, wages of lock-keepers and so on. There is nothing here for staff. I think it is hardly fair to take a statement which is based upon statements not of our own, but in answer to certain queries sent to us by the Committee, and say it does not show it fully. Of course it does not show the whole thing fully, because we have given that at a different place. If you turn to our annual expenditure you will see the thing is much more clearly stated there.

2968. But you charge them with the full proportion of the repairs for towing-paths over the whole district, from Lechdale to Staines, which you say is 7,586 *l.*, and the portion of the above 55 miles, between Lechdale and Day's Lock, 3,575 *l.*?—Yes.

2969. But the repairs to towing-paths must be considerably greater below Day's Lock than above, because the traffic is a great deal larger?—The traffic on the towing-path, I am sorry to say, above Staines, is very small anywhere, and there is nothing to create wear and tear. I must tell the Committee that these returns for a particular district which were asked for have been extremely difficult to prepare. Our accountant is in the room, and if you want any precise details he will be happy to give them, but it is extremely difficult to apportion to a particular district a share of the whole receipts and expenditure of a very large one.

2970. Of course I can only take the figures which we have here?—I am merely pointing out that we have endeavoured to make them as equitable as possible; we would rather base our figures upon our annual statements to Parliament, and you have got them up to the latest date, the 30th of December 1876.

2971. I have here an abstract of accounts which is taken by the Drainage Commissioners from the Parliamentary Returns, which shows the Parliamentary expenses and the law expenses for 10 years are 8,900 *l.*; will you tell me what that is for?—I suppose they have been adding up all our law and Parliamentary expenses.

2972. Will that include the Bill of 1866, which you brought into Parliament?—Yes, I think so, that is 3,200 *l.*; then we had an unfortunate case, which cost us a great deal of money. It was a case which happened a little way above Windsor. A barge was being towed up by four horses, and the man, according to our view, mismanaged the barge; he sheered the barge out, and the four horses went into the river and were drowned. The question was, who was liable for the repair of the towing-path? The allegation was, that the towing-path was too narrow. The owner of the land would not let us set his fence back, and the towing-path may have been too narrow; but that cost us a very large part of the expense. Then from time to time, I am sorry to say, we have been obliged to spend money in law expenses. There is a considerable sum in regard to compensation claims.

2973. I will come to that in a moment. I

Mr. Hall—continued.

want to ask you a few questions upon that point?—Then, again, we had to oppose in the House of Lords a certain Bill connected with the waterworks at Oxford, which we did most reluctantly.

2974. The sum of 3,200 *l.* was the expense of that Bill?—Yes, of the Bill of 1866.

2975. That Bill of 1866 was promoted by you?—The Board of Trade brought it in.

2976. But you paid for it?—Yes. Eventually the lower fund paid for it, but the Board of Trade brought it in.

2977. May I ask if notices were served upon those people whose property was affected by that Bill, because we have had some rather curious evidence upon that point?—I cannot recollect now exactly what was done. The Bill was brought in by the Board of Trade. It was based on the inquiry held in the year 1865, which I think must have been well known, for there was a great deal of evidence taken, and there were counsel enough employed. The Bill went through the usual form of a Hybrid Bill, and I presume that all proper notices were given.

2978. But you are aware that we have had evidence to the contrary here?—I know that, and I was surprised to hear it.

2979. I observe, in looking through your Bill, that certain individuals' interest are taken great care of; there is a Mr. Cherry, and a Mr. Campbell, of Buscot, and so on. Now if the matter had been generally known, is it not probable that other people would have wanted to save their interests, by some general clause?—I cannot remember how that may have been. I presume that the Board of Trade, or their Parliamentary agent, did all that was required; perhaps Mr. Cherry, Mr. Danbe, and Mr. Campbell, of Buscot, were more active than others, and they succeeded in getting those clauses in, but as you may suppose the Conservators did not put them in.

2980. Of course not; but at the same time it is fair to conclude, that these being in, others were left out?—The conclusion I should arrive at is, that the other parties interests were not sufficiently affected for them to appear before the Select Committee.

2981. According to the town clerk of Windsor, the others knew nothing about it?—I was astonished at his saying so, for Mr. Darvill is a very intelligent gentleman, and we have had a great many communications with him, and I was quite surprised to hear him say so; I cannot understand how it was that he did not hear of a Bill that was passed on the report of two Committees.

2982. It is rather an extraordinary thing that a Bill, which is your charter, should have been a surprise to such a man as the town clerk of Windsor. It strikes one as very odd at any rate?—His ignorance strikes me as very odd, certainly.

2983. Now, with regard to the compensations, have you paid all these compensations?—Yes, we have done with them, with the exception of two; there is one to Mr. Danbe, which is an interminable annuity, and another to Mr. Witherington, which will terminate in about 19 years.

2984. Have all claims on behalf of weir owners been paid?—Yes.

2985. Are these annuities stated anywhere as liabilities?—Oh yes, I think so; but they may be grouped you know; here is an entry "Compensation

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pensation Annuities, 58*l.* 3*s.* 7*d.*," in our annual account.

2986. And that includes the whole, does it?—Yes.

2987. Then with regard to this report of Messrs. Falkner & Tanqueray; you have seen it, I believe?—I have already stated that I have never seen it. It was a report, as I have just stated, made to the Thames Drainage Commissioners, I believe. It was a private report to them upon which they have never acted, as I have been informed.

2988. It gives an estimate for certain works which will have to be done, and seems to enfer that the Thames Conservancy would be probably inclined to bear a share of any works?—I have never seen it, and I can say nothing about it.

2989. If such a question as that arose, I suppose it would be not unlikely to lead to disagreements between the two bodies?—It is impossible to answer a hypothetical question, upon a report I have never seen. My idea is that if the Thames Valley Drainage Commissioners had been in a position to begin their works this would have happened: we should in all probability have been asked to do the works in the river, and they would have borne the expense; it is provided for in their Act, and we find it convenient with our plant, and our engineers' experience in these matters, to do works of that kind; we do them cheaper than anybody else, I believe, and we find persons on the lower part of the river ask us to do works for which they pay.

2990. As having charge of the navigation, you think you would probably be called upon to bear a share in any works that they might recommend; is that what you mean?—No, not in the least; what I meant was that any works which they required for the purpose of drainage we should probably have done more easily and more cheaply than they could; and they would have borne the cost. Of course if any works are done on the river which are *bond fide* improvements to the navigation, we are quite ready to bear our share of the cost.

2991. You have stated more than once that you consider that the present Board do not want much addition to their numbers?—Before you go on, shall I give you precisely an answer to your question as to the legal expenses; I have got the figures here now. The legal expenses connected with arbitrations were 2,041*l.*, and for the Act of 1866, 3,200*l.*, making a total of 5,241*l.* out of 8,600*l.*

2992. Having admitted that the present Board do not want much addition to their number, you have also, I think, admitted that if any rating powers are to be given to you, some important additions would in all probability have to be made. It is quite clear that the upper proprietors would not care to be rated unless they were thoroughly represented. You have admitted so much as that, have you not?—I did not use the words "important additions;" I said some additions, if we had large rating powers.

2993. Important rating powers, and only some additions?—Yes.

2994. I think we may gather altogether from the evidence, may we not, particularly Mr. Neate's evidence, that the upper proprietors are very much dissatisfied, and would be exceedingly glad to get rid of the Conservancy Board altogether. Have you read Mr. Neate's evidence?—

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Mr. Hall—continued.

Yes; I am in a difficult position as regards Mr. Neate's evidence.

2995. Perhaps you would rather not answer that question?—I am quite ready to answer the question, but I do not admit that Mr. Neate could be sufficiently aware of the opinion of all the landed proprietors, to make such a broad statement as that.

2996. I think you told us that you had, on a previous occasion, told Mr. Milner Gibson that your board was not at all anxious to take much of that upper part of the river?—No; I can only describe the position of our board at that time as being a sort of neutral position. We were very disinclined to take charge of it, unless sufficient funds were provided from the outset. Everybody agreed, and I am sure Mr. Milner Gibson agreed, that 5,000*l.* a year was not sufficient to complete the whole thing. But one of the Committees, I think the Committee of 1866, reported, among other things, "That at present rating is not necessary." The words "at present" evidently show, I think, that they were looking to some future time, when more money would have to be found.

2997. You are aware that the Drainage Commissioners represent a very considerable, and a very valuable, area of property, of no less than 55,000 acres, I think?—I do not know, although I have read their Act.

2998. Has this sort of feeling been brought home to you at all, that they seem to consider it rather hard that those who represent such large interests as 55,000 acres, which, at a moderate rental of 30*s.* an acre would be over 80,000*l.* a year, should be under the control of a London Board, whose interest may be fairly said to be represented, as far as the interests between Lechlade and Day's Lock are concerned, by the tolls of 1,100*l.* a year. Has that been brought home to you at all by evidence you have heard, or any other means?—I do not, in the first place, admit that we are what you call a "London Board." It is true our office is in London, but we have five gentlemen from the upper river, to say nothing of others, who do not care to be considered simply as a London Board, as some of the witnesses say, looking after nothing but the tideway; that is quite a mistake; it is an erroneous impression. The landowners in the upper district, with these large interests, I do not consider are under our control; our control is over the river.

2999. You consider the river is an arterial drain?—Certainly, and if they will come at some future time before some other Committee, and state that the Conservators have prevented them doing works, or have refused them permission to do works, in an unreasonable and arbitrary manner, or to state that they have been more than once, or even once, to the Board of Trade, to get the decision of the Conservators altered in any way, then I think they may fairly say they have got an obstructive Board that sits in London. But as things stand at present, we have had but two communications from that body, and I say, on the part of the Conservators, that when we get any communications with regard to their works, they shall receive that elaborate and fair consideration that we give and have given, for 20 years, to all the new works on the river.

3000. Still, the broad fact remains, does it not, that your pecuniary interests are not at all comparable, yours being very small, and theirs being

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being enormous?—I do not quite understand your point. The pecuniary interests of the whole Conservancy Board are very large; 75,000 l. a year.

3001. I am asking you with regard to the jurisdiction of the Drainage Commissioners?—No doubt their property is very large, and our toll receipts in that district, I am sorry to say, are very small comparatively.

Sir Trevor Lawrence.

3002. Has anybody whatever power to go to the Board of Trade, or only the Drainage Commissioners?—Only the Drainage Commissioners with regard to new works. For instance, if we refused a man to put a pile in the river in front of the Houses of Parliament, he has not got the power, which the Drainage Commissioners have, of going to the Board of Trade and saying, "Here these people are preventing me doing this; will you overrule them"; whereas, as I read the Act, the Drainage Commissioners have that power.

Mr. Hall.

3003. With regard to Imperial interests, of which you said something: supposing the jurisdiction above Day's Lock were recommended to be alienated, might I ask you how the Imperial interests would be affected by the change, or would they be affected at all?—Except that the Thames is a large, and most important river. But the phrase "Imperial interests" is not mine. It is a phrase of a Select Committee of the House of Commons, for which I have such respect that I quoted it.

3004. That is more applicable to the tide-way than to any other portion of the river, I suppose?—No, I think the Imperial interests may be extended a great deal beyond the tide-way. I think the Thames is such an important river, and when you consider the Queen lives on it, that you may call it an Imperial interest.

Mr. Cartwright.

3005. And the Houses of Parliament are upon it?—Yes, only they are on the tide-way.

Mr. Hall.

3006. Do you think that a change of jurisdiction above Day's Lock would have a tendency to lead to any disputes between the Drainage Commissioners and the Thames Conservancy?—I should like to put the word "dispute" on one side, but I have a very strong opinion that when you have one Board, and one engineer, you are more likely to manage the river properly than if you split it up into districts. There is no doubt at all about it. It seems a big stretch of river, but with the present means of communication by railway, and so on, as I have already stated to you, I am sure it would be a mistake to divide it into districts. I read some very strong evidence of Mr. Bradmore's upon that very point, given before a previous Select Committee.

3007. I do not ask you so much as to the general policy of dividing it into districts, as with regard to the special point whether you think it would lead to increased misunderstandings, supposing the jurisdiction above Day's Lock were to be transferred to the Drainage Commissioners?—I must say again there have been no misunderstandings, therefore there can be no "increased misunderstandings," but I still think

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that it would be desirable that the Drainage Commissioners should keep to their proper business, which is the drainage of their property, for which they were established, and I undertake on the part of the Conservators to say that we shall be quite ready to meet them, and to facilitate their operations, because that may be a great benefit to us, from the country up there being drained and regulated, and if we have the means we will very soon improve the arterial drain, which is the river up above Oxford, so that we should naturally benefit each other. But to take away a particular district, and hand it over to them, as regards water supply, navigation, and so on, I think would be a mistake.

3008. But you have a joint jurisdiction over the same district now, to some extent, have you not?—No; I have already stated in evidence I do not admit a joint jurisdiction. The Drainage Acts provide that they shall, in a certain district, do certain works, subject, of course, to our veto, but there is no jurisdiction; and more than that, supposing that they executed works in spite of us, by the authority of the Board of Trade, there is a clause which provides that we shall still have the control over the river.

3009. But does not that all tend to show that there is a great deal more likelihood of disputes, when they have something to do over the same district over which your jurisdiction extends, subject to the same veto; there is a greater chance of dispute then, is there not, than if they had absolute authority down to a certain point, and you took up your authority from that point downwards?—It is manifest that if in a particular district the body controlling the navigation is to be removed altogether, and the Thames Valley Drainage Commissioners are to have it entirely to do what they like with, there could be no conflict of authority, because the Conservators would cease to exist as far as that district was concerned.

3010. There might, I suppose, be a conflict of authority where the junction was?—I again repeat that I think it would be a great mistake not to let the Thames remain under one authority, and be managed by one staff.

3011. Prior to 1866, the navigation authority was constructed in sections, was it not?—Upon my word, I hardly know. There were 700 or 800 Commissioners, but whether they divided themselves into committees for each district, I do not know; all I know is that during the latter years of their authority they did nothing, though they occasionally met. We have one of them upon our Board, and I may tell you, if it may be considered evidence, that he told me very distinctly that he knew there were troubles even in those days between the old Commissioners and the Corporation at Staines.

3012. As to tolls, or something of that sort?—No, it was something to do with works, I think; but I wish to say that he, having been a Commissioner, was of opinion that dividing the river at a certain point would be unwise.

3013. The old Commissioners, however, managed to pay 10 s. per cent., did they not, upon their debt?—They paid it up to 1863, I believe, but they allowed all the works to go to ruin.

3014. At all events, the plan of Government then was a proper representation of the land-ownership, of the university, and of the towns on the banks, was it not; that was the theory of the



Mr. Hall—continued.

the thing?—No, the absurdity was this, that the present constituency were the Commissioners; there was no election. The list I have read to the Committee were the men to manage the river; they were called Commissioners, but they were not elected; they became Commissioners from holding certain offices and certain lands.

3015. Almost every riparian interest was then represented?—Quite so, and the result was collapse.

3016. But that was owing to the railways taking the traffic?—I suppose so, to a certain extent; but one can hardly suppose that 700 or 800 were required to manage the river above Staines, when it has been so well done by the Conservators since.

3017. But still a drop from 700 to 5 is a very considerable one, is it not?—There is a considerable difference between 700 and 5; I cannot controvert that.

3018. Then you cannot wonder if the riparian owners in the upper waters feel their case rather a hard one?—The peculiarity is, that they seem never to have taken any interest in these matters. If they took such a great interest in the upper river, and so forth, why have they not brought forward a fresh candidate? If they thought we were becoming effete, they might have infused some new blood into us; by bringing forward some gentleman from that upper district.

3019. But do you not think that their having so few as five upon that large Board, accounts for their apathy?—I do not think that will account for it.

3020. The Oxford and Birmingham Canal comes into Oxford, does it not?—Yes.

3021. And the Thames and Severn at Lechlade?—Yes.

3022. Are there any others?—There is the Kennett and Avon at Reading, I think.

3023. Have you ever had any difficulty with these canals, as to the height of the locks or sills, or anything of that sort, where your powers join?—No, I think we have had some correspondence with the manager of the Thames and Severn.

3024. Of a disagreeable character?—No, I have got an abstract of it here, it is rather lengthy, and it extends over a good many years. It is chiefly that he has got an idea that the upper river can be so improved as to carry a large navigation; I presume that he, and the persons who manage the Thames and Severn Canal, are prepared to improve that canal at the same time, and having that canal so very much improved, and the river very much improved, it is just possible that there might be some traffic, but it does not look very hopeful; I see his last letter requires immediate payment of so much, because their tug the "Spanker" has been delayed.

3025. Anything more?—No, I do not know that there is anything more.

3026. You said just now that if your body were made more cumbrous, these visits to the upper river would be rendered more difficult; I could not quite understand that?—Our steamer does not hold 30 to begin with, and we should require three or four detachments, at least, to go up and down; and if we were made so large as the number mentioned by the honourable Chairman, 30, we should be in great difficulties; I do not think our board room would then hold us, and then, of course, each additional member beyond

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a reasonable number, lengthens discussion; I am quite sure that a board of a moderate size is far more easily workable than a board with large numbers.

3027. The Drainage Commissioners have rating powers now?—Yes, unlimited.

3028. Do you not think it would be a fair cause of complaint of the riparian owners, if a second body were created also with rating powers; if you had rating powers, for instance?—The rating powers of the Drainage Commissioners I always look upon as a sort of domestic arrangement for the improvement of their land, comprising, I suppose, a great many of the tenants of the various landed proprietors, and so on; our rating, of course, would be with a different object, the improvement of the river, but I have never gone carefully into the rating question; I have a different solution of the matter, as I have already told the Committee, which, I think, will obviate all these nice and difficult questions of rating.

Sir Charles Russell.

3029. I think I gather that you are strongly of opinion that works at no great cost can be carried out on the Thames to mitigate the floods?—I think a great deal might be done at no great cost, so far as dredging goes, and making certain tumbling bays, and so on. That, I know, is the opinion of our engineer, that it might do a great deal towards mitigating the floods. I do not know whether it would touch such tremendous floods as those of 1875 and 1876, but ordinary floods, I should presume, would certainly be mitigated, and we have endeavoured, as far as our means have enabled us, to do that.

3030. Would the 20,000 £, which you spoke of just now as the sum required to carry out the improvements you contemplate, form part of the 68,000 £. which Mr. Leach estimated they would cost?—It is a separate district entirely. Mr. Leach's estimate and plan, as I have already explained to the Committee, have never been considered by us. They refer solely to the district below Staines. The 23,000 £. which I mentioned is for completing works chiefly in progress, which are absolutely necessary above Staines.

3031. But surely his object is to diminish floods generally in the river, as I understand his evidence?—Yes.

3032. Therefore the 20,000 £. that you are expending above Staines might be beneficial for the same object?—Certainly, in constructing the new works; as an instance, I may take the weir immediately above Staines. When we have the money to rebuild Bell Weir, Mr. Leach is prepared to improve that in such a manner that it will, no doubt, help to carry off the floods more rapidly. But that estimate which was brought before you, which I wish to keep entirely distinct, is a mere idea as to what could be done below Staines, if it was thought desirable to spend so large a sum there.

3033. With regard to the charge upon the water companies, they now pay a lump sum, and the water is not estimated at so much per gallon, is it?—No.

3034. Do you know if that is a better plan than charging them per gallon?—I certainly have not considered that, but if we were to get more from them by charging them per gallon, I think

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think the charge per gallon would be the better plan of the two.

3035. The ground upon which you ask for this money from the water companies is, that you maintain that the works which have been done, both by yourself and the towns, which, under your powers, have been compelled to divert their sewage, have so far benefitted the water companies, that it is a fair and reasonable claim to make upon them to contribute to the further maintenance and improvement of the river?—Yes, and I quoted from the evidence of the late engineer to the Water Companies some words to that effect.

3036. Are you aware, or have you heard it stated, that the filter beds of the different companies are now less costly by reason of the state of the water having been materially improved?—I do not know.

3037. Do you conceive that you ought to have greater powers than you have at present, in controlling the mills, and in preventing persons who cut weeds from leaving them in the river?—The weed question has not escaped us, for we have now a bye-law, waiting confirmation by the Queen in Council, upon that point; but from circumstances into which I need not enter, as they do not refer to this inquiry, that bye-law has been tied up for many months. I did not catch the early part of your question.

3038. Whether you should have greater control than you have over the mills?—I think we have a very great control. Our control over the weirs is complete, but the millers I believe do, and I suppose they still have the power to do it, shut in the gates in front of their wheels, which however is so infinitesimal in a flood that it need hardly be considered. The millers' right are provided for in the 48th section of the Act of 1866, which says, the Conservators may regulate as they think fit, the opening, shutting, and management of the locks and weirs on the Thames, and the drawing down or keeping back of the water by means of any of those locks and weirs, but they are not to interfere, in the case of any mill, with the maintenance of as efficient a head of water for the purposes thereof, as at the passing of this Act may be lawfully maintained for those purposes. Now that is the magna charta of the millers, as far as the river is concerned.

3039. Do you think it would be beneficial to the management of the river, that some controlling authority should be placed over the tributaries?—That is a question I have really hardly considered; I think, as a rule, the tributaries are not very large, and we have control with regard to the sewage for five miles up the tributaries.

3040. You do not think it would affect floods, if you had the means of telegraphing to stop or let down the water?—I do not think I can answer that question. I have never considered the question of the tributaries; I have looked upon the main river as the principal object of our operations, and I find that the main river is quite sufficient to manage at present.

Mr. Cartwright.

3041. When you have been down the river, has your attention never been drawn to the action of the Cherwell upon the floods?—I do not think it has specially, but I do not remember.

Sir Trevor Lawrence.

3042. What proportion of the smallest summer flow do you calculate that the water companies take?—I think you have had that already.

3043. Is it one-fifth?—It is variously estimated, I think it was given in evidence as 330 million gallons in 24 hours over Teddington Weir, and then I think the Chairman stated that it is nearly 350 million gallons.

Chairman.

3044. I think you stated it was about a fourth?—You read me some figures, and I admitted it must be somewhere about that.

Sir Trevor Lawrence.

3045. Of course most water is taken by the water companies at that period when the flow in the Thames is less, in the summer; there is then a larger demand for water?—I suppose people drink more water in hot weather.

3046. And they use it generally more to water streets and so on?—I suppose so, but I do not know exactly.

3047. The object of asking you the question is to see whether the portion of the water which the water companies abstract throws any extra expense upon you in maintaining the lower navigation in the way of deepening or dredging the channel or not?—I really have never looked at it in that point of view. I should think it is hardly sufficient to affect it, but I should not like to say positively.

3048. I think something which you mentioned in the course of your evidence indicated that you were not perfectly satisfied with the way in which the water taken by the water companies was measured?—Well, we would rather have counters on the pumping engines.

3049. How is it measured now?—I think it is measured by the capacity of the pipe and the velocity of the flow. I think our engineer has occasionally been there, and I think we have certain powers in some of the Acts, but I have not gone carefully into that. We have an application now before us from a water company to put a pipe under the river at Richmond, as a conduit, and we intend to ask them to put counters on their engines as part of the agreement for allowing them to put that pipe under the river.

3050. It is not your business to maintain the banks of the river, is it?—The bank question is a very puzzling one, and one I should hardly like to detain the Committee long upon. In the lower part of the navigation, the towing paths are almost generally our property, but in the upper part they almost entirely belong to other people. The old Commissioners paid a very small toll, or rent I should call it, for the permission for the horses to go over the towing-path. But we maintain that the riparian owners ought to keep their own banks in order, and from evidence which I have read up lately taken before either the Committee of 1865 or 1866, I really believe it was intended that each riparian owner should maintain his own banks, because I see from certain questions put by counsel, some people were frightened at the liability. Now, down here, we can make a wharfinger repair his wharf, if it is injurious or dangerous to the navigation, but above Staines we have not that power, and in consequence of a decision of some of the judges in one of the cases which we had, we are really

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really rather puzzled as to whether we are liable, which I hope we are not, or whether the riparian landowners are liable. But you see it stands in this way; many of them do not care in the least whether the towing-path is maintained or not. We had a case only the other day, the towing-path could not be set back, and it was undermined; they say "Let the towing-path go"; but the Conservators must keep up the towing-path, and if the water is deep, the expense is very large indeed.

3051. It has been stated several times that a great deal of injury has been done of late years by the wash from the steam launches on the banks. Do you bear that statement out at all?—I do not think as yet any great injury has been done, but we do hear complaints that these steam launches go at such a speed as occasionally to damage the banks. If they do, and we can get evidence, we shall, of course, prosecute them, because it is contrary to our bye-law. But it depends very much on the depth of water in the river at the spot, and it also depends not so much on the speed as on the shape of the vessel. One vessel will go at a very little speed, and make a great wash, and another will go at a great speed and make very little wash.

3052. I believe you prosecute the owners of the steam launches for endangering the safety of people in boats, and so on, but not for damaging the banks at present?—No, I do not think we have had a case yet with regard to the banks.

3053. With regard to the meetings of the Conservators being always in London, I suppose no greater practical inconvenience arises from that than from the board of directors of a great railway company which extends over 1,200 miles, meeting in London; it is an analogous case?—I think so. I think we arrange our Upper Navigation Committee meetings so as to be on the same day as the Board meetings, which makes it much more convenient to the gentlemen from the upper district. They come up on Monday and attend the committee afterwards. Formerly that particular committee used to sit on Thursday, and there was certainly an inconvenience in bringing gentlemen up on that day, but we now always have our Upper Navigation meeting, when it is required, which is not constantly, after the Board meeting. Of course, for any man who is not living in London it is more inconvenient to come to the Board meeting than if he lived in London.

3054. Do complaints reach your office with regard to the effect of floods?—Yes, we have had them both ways. I think we have had one farmer asking us for compensation because his land was flooded, and another because it was not irrigated.

3055. I suppose no very large number of letters come to you upon that particular subject?—No. I think I have put in some, but there are not very many; in fact really we heard very little about the floods until this last flood, when all these public meetings took place.

3056. Is it your opinion that the damage done by the floods of 1875 and 1876 has been greatly exaggerated?—I am very glad you have asked me that question, because I am surprised that it has never been put, so far as I know, anywhere. Some vague estimates, for after all they can only be approximate estimates, as to what the damage has been, have been made. Mr. Nelson told you it had been exaggerated. I have no data to go

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upon, but I am positive that a great many of the statements made at these public meetings must have been exaggerated, and I think so from analogy. I know that the statements made there with regard to the Conservators have been entirely erroneous, so I think that the statements with regard to the damage done by floods have been exaggerated. That they have caused inconvenience and damage, nobody, of course, doubts.

3057. Have you received any complaints from landowners with regard to the action of the mills in damming back the water, and so flooding their meadows?—It is impossible to say offhand whether we have or not; we may have done; but some people have such peculiar ideas with regard to weirs; I might give you an instance; we had not very long ago a formal complaint from a man navigating the river with regard to the weir at Teddington, which he said was shut in in a tremendous flood; of course we caused an inquiry to be made, and our lock-keeper, who has been just promoted, a very intelligent man, sent us up a very pretty sketch, showing that the weir tackle, the shutters, and so on, which are very heavy iron shutters were all lifted; but it so happens that statements of that kind, letters in the newspapers, and so on, get abroad, and of course nobody knows that there is a contradiction to them, or an explanation of them.

3058. I suppose there is no doubt whatever the amount of damage done during the floods of 1875 and 1876 may have been, that in the previous years, between 1852 and that period, there was no great amount of damage done anywhere by the floods?—Yes, I believe that is so, but my acquaintance with the river only dates from 1861; I should say certainly it is so.

3059. In fact, in the interval between periods of great floods, whatever is done by the overflow of the river is rather an advantage than an injury?—I do not suppose that is so entirely, but on certain grass land they seem to rather like a winter flood; what they dislike is a summer flood, which washes their hay away.

3060. Those appear to be very rare?—Very rare.

Chairman.

3061. With reference to a question put to you just now, do you think it advisable to have further jurisdiction over the tributaries, with a view to mitigating the floods, than you have at present?—I have never considered that question very carefully, and we have never had any evidence before us, as far as I can remember, that it would be desirable for us to obtain an extension of our jurisdiction over the tributaries, so that I am hardly prepared to say aye or nay to that; all I can say is, if it is desirable that the tributaries should be controlled, and it is thought desirable that we should do it, supposing means, or rather I think powers is the word, which includes means, were provided, we should be glad to do it, but I cannot help thinking, with reference to this question, whether the tributaries could not be better managed by bodies something analogous to the Thames Valley Drainage Commissioners, so that the tributaries might be managed by persons in the locality.

Mr. W. H. Gladstone.

3062. Would you wish to have a veto upon any of their proceedings, supposing such bodies were

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were constituted?—It would entirely depend upon what they were empowered to do; if they were empowered to do anything which might affect the supply of water to the metropolis, or anything which might affect the Thames, of course we should naturally require to have some sort of control, but it is a question which I must own I have hardly considered.

Chairman.

3063. Nor do you lay very great stress upon it?—I think not.

Sir Trevor Lawrence.

3064. You were about to explain how the 2,500 *l.* were distributed, but you did not do so?—I shall be happy to explain it, although it is a domestic arrangement. At each committee, each Conservator attending the committee, if he signs the book showing that he has attended, receives 5 *s.*, that is an old arrangement which has been continued. But the basis of the distribution are the board meetings. The remainder of the 2,500 *l.* is each month divided according to the attendance at the board, the deputy-chairman receiving a double allowance for his labour in frequent extra attendances at the office.

Mr. Hall.

3065. Are any travelling expenses allowed?—We pay all our travelling expenses out of the common fund.

3066. Supposing an upper proprietor, being elected, attends the Board, does he get his travelling expenses, or only 5 *s.*?—If he comes to the committee he would only get 5 *s.*; but we arrange for the committee to be always on the Board day, and if he attends the Board regularly he gets his share of the 2,500 *l.*, but he does not get any travelling expenses for coming up.

3067. And the Board is always held in London?—Yes.

3068. Therefore, a man who resides in London is subject to no expense and gets his 5 *s.*, and a man who resides at Oxford is subject to travelling expenses, and only gets his 5 *s.*?—The committee payment is 5 *s.*

3069. And what is the Board payment?—It depends upon the number of people who attend. I will tell you what it averages. I should say a member attending the Board very regularly, and attending our permanent committees very regularly, would receive about 110 *l.* a year.

3070. What do you call very regularly; how many attendances would that be; could you give it me per attendance?—I know best from my own attendance; I have been rarely absent from the Board since I have been upon it. What I mean is if a man attends regularly and does not miss many attendances, he will receive about that.

3071. I want to know what it is per attendance?—Then I must get the number of attendances in a year, and divide the 110 *l.* by that.

3072. A man residing at Oxford having to attend these meetings is put to greater expense than he would be if he lived near London, all the Board meetings being held in London?—Of course it is quite manifest that if a man resides at Oxford, which none of our members do, by-the-by. Mr. Clutterbuck is the furthest off; he lives at Long Wittenham; he, in a pecuniary point of view, is at a disadvantage with his

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fellow-Conservators who happen to live in London.

3073. He is a positive loser in the course of the year?—I would put it that he is not so great a gainer.

Chairman.

3074. Does Mr. Clutterbuck attend pretty regularly?—Very regularly.

Sir Trevor Lawrence.

3075. I understand if you visit Oxford on duty your expenses are paid?—Yes.

3076. Whereas the expenses of the people who come from Oxford to attend to their duties in London are not paid?—No.

Mr. Richardson-Gardner.

3077. You stated, in answer to the honourable Member for Surrey, that the statements have been very much exaggerated with regard to the floods; does your experience relate only to the land of which the honourable Member spoke, or to the towns?—I may at once state fairly that I do not know that I have any special experience in the matter, and what I have been surprised to find is this, I have never seen anything like an approximate estimate with regard to the damage. With regard to the towns, if people will build very small houses on lowlying portions of the land close to the river, it is not surprising that they will be flooded. As Mr. Nelson pointed out to you in a particular case at the last meeting: he said that a neighbour of his had built his house where he must of necessity be flooded, therefore I have no doubt there has been great inconvenience, and I daresay damage done to property in that way.

3078. Houses may have been built in this last 30 or 40 years, and therefore they find themselves flooded when these great floods which have lately taken place come on. Is it your experience that in Windsor, for instance, there have been 200 or 300 houses with two or three feet of water in them in consequence of the floods, and that must be in itself, not only a great inconvenience, but must do a great amount of damage?—Of course.

3079. You are not aware of the damage done to the riparian towns with regard to the floods that enter the houses?—I know no more about it than the general public does, but I know as a fact that houses have been built in very lowlying positions in some of the towns, at Windsor, Reading, and others, and as a matter of necessity, when a heavy flood comes they are flooded.

Mr. Hall.

3080. And it would be almost impossible to exaggerate the damage which is done thereby, I suppose?—Except the want of wisdom in building them in that position.

Mr. Richardson-Gardner.

3081. In some cases there may be no means of building houses except in particular places?—Quite so; and I am not sufficiently acquainted with those particular localities to answer the question. With reference to a question asked as to the tributaries, I have been just informed that

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that we have received letters from parties interested, asking us to obtain powers over the tributaries when we next apply to Parliament with respect to fisheries. Whether we should do so or not is a very different question, but we have letters asking that.

*Mr. Cartwright.*

3082. Were those letters from Oxford and district?—From some fishing associations.

*Chairman.*

3083. As regards the Thames and Severn Canal, have you received any complaints from that body as regards the state of the navigation on the upper part of the river?—I think the best answer I can give to that is contained in a letter I handed in in answer to the resolutions at Gloucester; I think you will find that letter deals with it.

3084. But you are ready to admit that the navigation of the upper part of the river above Oxford is not in a desirable state?—Certainly, it is not in a desirable state, because the desirable state of a navigation is that it should be, first, in good order, and then that there should be plenty of traffic upon it. This is not in a satisfactory state as far as navigation goes.

3085. Are you ready to admit that it is in a neglected and deplorable condition?—I can hardly go so far as that. It is not in the state I should wish to see it, and it perhaps remains as a memento of the general state of the river before we took charge of it.

3086. From the floods has the river been allowed to silt up above Oxford?—The last floods certainly have created a shoal or two, which we have directed to be removed. There is one in particular we saw ourselves not long ago at St. John's Lock. There are two shoals lower down which we should very much like to remove, only it would be an expensive affair, and we are afraid they will crop up each year, and to go to a large expense one year, and to begin it again the next, without any prospect of a navigation, seems to us to be an undesirable expenditure of money.

3087. What is the state of the Thames and Severn Canal itself?—Well, I have not seen very much of it, but I heard that it is in an indifferent state, as far as the navigation goes. What I saw of it was chiefly near Cirencester, where we found a large pumping engine pumping a beautiful spring of water there into the Thames and Severn Canal, to supply the water which leaked out of it; it was at a place called Thames Head, in fact it is our spring, and the head of our river is being put into this canal.

3088. Is that at a place called Kemble?—Yes.

3089. With regard to financing, are you prepared to acquaint the Committee with any alterations in the tolls on pleasure boats and steam launches that you would wish to see carried out?—We have not gone into the detail of that.

3090. I think the Committee now understand that you would only rate riparian properly, as a *dernier resort*, and you think that the key to the whole position is what you can extract from the water companies?—It seems to me a simple and easy way.

3091. The six great water companies, besides the little Surrey Company, which pays 50 l.,

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contributed at present 6,500 l. a year. Will you tell the Committee what addition to that sum would satisfy your desires?—I should think the answer would come better when a Bill is before the next Select Committee.

3092. But if we found a Bill upon the evidence before this Committee, it would be important to get that?—I have never consulted my colleagues, or looked carefully into it.

3093. You are not prepared to give an opinion?—No, because if I put it too low it would be unsatisfactory to the Conservators, and if I put it too high it would be unsatisfactory to the water companies.

3094. I am supposing that the water companies are willing to be taxed?—I have guarded myself in my evidence against anything like the enormous sum which has been mentioned, 20,000 l. a year, or anything of that kind. I had not that in my mind.

3095. Perhaps you are not aware that the water companies supply Major Bolton, who is the Government Inspector of water works, with the daily supply of water given by each company to the public?—I was not aware of that; I knew he was the Government Inspector, and I have seen his reports from time to time in the newspapers.

3096. You have not seen this statement that is published monthly, which is a public document?—No, I have not seen it, and I am surprised that the Conservators are not supplied with it.

3097. Perhaps if the Conservators were to apply for it, it would be supplied to them; but from the average daily supply being always furnished by Major Bolton, can you imagine that the amount can be ascertained by any other means than by counters upon the pumping-engines?—I should like to know how Major Bolton arrives at it.

3098. Is it not by returns from the water companies, according to Act of Parliament?—I suppose so. I do not know, but I cannot help thinking that an automatic counter would give more accurate results than any other mode.

3099. Have you ever applied to any water company which is obstructing your water to adopt their counters, and have they refused to apply them to their engines?—No, I think not. So far as I know, I think one or two of them have counters.

3100. Are you aware that any metropolitan water companies have complained?—I do not know, perhaps I overlooked it, but I believe we do receive some returns from the water companies monthly with regard to the quantity of water.

3101. You have stated that you consider all the works along the river have been carried out well and judiciously as far as your funds will permit; have the Board of Trade ever sent an engineer to inspect your works?—No.

3102. There is one more question which I think you have already answered, but perhaps it would be very desirable that the Committee should have no doubt upon the point; if one body like the Thames Conservancy, having entire jurisdiction over the whole river, and having a veto upon any works carried out by the Thames Valley Drainage Commissioners with an appeal between those two bodies to the Board of Trade, or some other Government Department, do you consider that such an arrangement would work harmoniously and satisfactorily?—I presume you mean

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Bart., c.s.

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mean that the Thames Conservancy Board should have the full control of the river, and that the Drainage Commissioners should be the persons to drain the land into the river, and in the event of

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any trouble, an appeal to a Government authority.

3103. That is it?—I do not see why it should not work very well.

Mr. TRAVERS FALKINER, called in; and Examined.

*Chairman.*

Mr.  
Falkiner.

3104. You are a Civil Engineer and a member of the firm of Hemans, Falkiner & Tancred?—Yes.

3105. And you were called upon by the Drainage Commissioners to make a report?—Yes, they had at the time obtained the Ordnance Survey, it was just complete.

3106. What is the date of that report?—July the 28th of last year.

3107. Have you furnished the Thames Conservancy with a copy of that report?—I do not know, the Drainage Commissioners published the report.

3108. Have the Drainage Commissioners acted upon your report?—Not up to the present time. We have had no communication with the Commissioners since that report was published. I may say the report was made to the original Commissioners who have since, according to the provisions of the Act, retired, to make way for the elected Commissioners.

3109. What is your opinion of the state of the navigation in that part of the river, as far as the jurisdiction of the Drainage Commissioners extends?—Above Oxford the navigation is very bad indeed.

3110. From Day's Lock?—From Day's Lock to Oxford it is tolerably well, but above Oxford it is very bad; there is no navigation at all between Cricklade and Lechlade; you may come down in a small pleasure boat, but there is no navigation for barges.

3111. And you suggested certain works to be carried out to improve the navigation, as far as the drainage is concerned?—And also as far as we could to keep up the navigation. The two things are consistent, because it would be necessary to keep up the summer water for the benefit of the lands, and of course that would maintain water for the navigation. There is one statement in that report which I would wish now to correct, and that is that if the works that we proposed were carried out, the navigation could be carried on without flashing. Further consideration has led us to the opinion that it would be necessary to reinstate two weirs; one below Radcot Bridge and the other below Tadpole Bridge, and also to improve Hart's Weir which is just below New Bridge. Of course, if these are reinstated, so far as the weirs themselves are concerned, there would be something like flashing to be done at them, such as is done at King's Weir; but we are of opinion that to put the navigation into perfect order there should be locks at two of these points, that is, below Radcot Bridge and below Tadpole Bridge, at some places between Tadpole Bridge and Shiford.

3112. Did you go into any estimate of the amount?—Yes, the estimate is set out in detail at the end of the report.

3113. And the total amount is what?—The total amount for the Thames proper was 88,600*l.*,

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and for the tributaries 22,500*l.* There are about 60 miles of the river within the jurisdiction of the Commissioners, and there are about 40 miles of the tributaries which might be considered arterial, making altogether about 100 miles. The total drainage area is 1,315 square miles, which is less than half the drainage area to Staines; the total drainage area to Staines is 3,086 square miles.

3114. If these works had been carried out, would they have affected the floods in the Thames, either detrimentally or in mitigation?—They would mitigate the floods in the upper part to a very considerable extent; we consider that that would provide for all floods, with the exception of the few great floods that occur at intervals of years.

3115. Is this report still under consideration of the Drainage Commissioners?—I really cannot say.

3116. But they have not acted upon it?—Not up to the present.

3117. Mr. Rawlinson has informed the Committee that he believes the best mode of grappling with the difficulty of the floods in the valley of the Thames, would be by embanking upon both sides of the river, at some little distance from the bank; have you any information to offer upon that point?—I think the banks should be placed at a very considerable distance from the bed of the river, otherwise they would increase the current of the river so much as to scour away the banks.

3118. The carrying out of the work would be one of considerable cost, I presume?—I think, in some parts of the river it would not, but would be a valuable adjunct to keep the floods off, but if the river were to be embanked closely upon each side, it might carry away the weirs and locks, as well as the banks themselves.

3119. Are you of opinion that by removing obstructions in the river, dredging the bed of the river, and straightening certain points, that the floods would be diminished?—In our estimates we have included 60,000*l.* for dredging; 45,000*l.* of that is for the Thames proper, and 15,000*l.* for the tributaries; the rest of our estimate is composed, to a considerable extent, of increasing the area of the weirs, which is most important; and upon that subject I may state that we do not consider fixed weirs would be the proper mode of construction, and we contemplate lifting gates, which would control the summer floods, and give the passage to the winter water; would keep the water up in summer, and let it down when the floods came on.

3120. Do you think, by increasing the width of the tumbling bays that the water would be carried off more readily, and the floods diminished?—That part of the river is not suitable for the construction of tumbling bays, and the discharge from tumbling bays under the same head (under such heads as we should have to deal with there), are very much smaller, per foot

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Chairman—continued.

run, than in the case of sluices. There is no stone in the district suitable for the construction of weirs, and they would be more expensive, probably, than they would be elsewhere, on that account.

3121. Do you consider the mills affect the flow of the river, and thereby tend to increase the floods?—No doubt they do, but the mills are at the points where the locks are; and if there were proper sluices at these points which gave sufficient water-way, I think the mills could be quite controlled, and I do not think they would do any harm.

3122. Do you think that anything can be done by means of impounding reservoirs?—I do not.

3123. The volume of water in floods would be too great?—I have looked into that question, and if you were to make, say at Newbridge, which is about the best site that occurs to me, a reservoir 15 feet deep at that point, you would have to embank the river upon both sides for 10 miles up, and then your reservoir would be only an average of 6 feet deep. I looked into the history of the river, and I found the following information, which perhaps the Committee might like to have. I have looked into the history of the works on that part of the river, and as to the time at which they were constructed, and I have found the following reports bearing upon the subject: the first is a report of Mr. Jessop to the Navigation Commissioners; the second a report of Mr. Mylne in 1791, the third a report of Mr. Mylne in 1802.

Mr. Cartwright.

3124. These are old reports?—They are abstracts from reports upon the river. Mr. Jessop's report was made in 1789, and I have prepared a table showing the condition of the river in 1802, as compared with its present condition, setting out the several weirs and locks on that part of the river which is under the jurisdiction of the Thames Valley Drainage Commissioners. (*The Table is handed in to the Committee.*)

3125. I observe you make reference in this respect to personal examination?—Yes.

3126. You have been over the whole ground to which this report refers?—Yes.

3127. And it is from personal inspection and examination that you come to the conclusion which you have embodied in this report?—From personal inspection, combined with the information which I obtained from surveys.

3128. From inspection, combined with personal examination?—Yes, and I may say that the information given by the Ordnance Survey was not sufficient for the work which we had to do, but it gave us the means of making approximate estimates, and we have guarded ourselves in making the report in this way, that it is good so far as the information at hand enabled us to make it.

3129. You have not spoken as to matters which you did not personally inspect?—We have personally inspected the whole of the ground.

3130. Now amongst the points to which you draw attention, I observe there is a provision for overflow at weirs, sluices, locks, and mills, and again you refer to the silting up of the bed of the river, and to the undue damming back of the water from mills; are you prepared to say that these are matters which there ought to be due provision for, the overflow at mills, the silting up

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Mr. Cartwright—continued.

of the bed of the river, and that the damming back of the water from the mills really does exist in the upper river?—Yes.

3131. You have heard, probably, the evidence which has been given on the part of the Conservancy in which it has been stated that there has been much exaggeration as regards the damage done by mills?—No, I did not hear that.

3132. You are clearly of opinion, I gather from this report, that the damming back of water from mills, as it is at present done on the upper river, is injurious to the riparian interests, and to the general state of the river?—Clearly.

3133. Could you mention to the Committee any point where there has been that undue damming back of the water for mills?—My evidence would be this, that at all the mills the sluice power is quite insufficient to allow flood water to pass; that the water is kept up for the purpose of the mills, and unless proper provision is made to pass the flood waters, which provision should be under the control of the Commissioners, the water is practically dammed back for the use of the mills.

3134. You are talking of the Commissioners; you mean the Conservators?—I was talking of the body which has the general control of the river.

3135. I suppose you have made personal inquiry whether the control of the water and the mills is vested practically in the hands of the millers, or in the hands of the Conservators?—I believe it is practically in the hands of the millers. I would mention the case of Sutton mills; there are only 45 feet of tumbling bays, and three small openings, 18, 20, and 23 feet wide, which are stopped by small wooden paddles. The means of letting off flood water there is quite insufficient. That is one case.

3136. Could you name any other?—So far as I can calculate, the weir at Iffley is only one-fifth of what it ought to be.

3137. In the course of your inquiry have you heard complaint often made by those who are living on the banks of the river, in regard to the action of the millers in this matter?—I have heard some statements made, but I have not had much communication with the landowners.

3138. But the matter has been brought under your notice, or at least it has reached your ears, that there are complaints, and that the complaints are pretty frequent with reference to the action of the millers in that matter?—Yes.

3139. I see you have come to the conclusion that it has been necessary to raise the head from time to time, to retain some amount of power in the mills, when the level of the tail water has been raised by the silting up of the bed. You are confident that there are such cases which have been brought under your notice?—I have heard it stated, and I believe it to be the case.

3140. But you have not at all inspected the matter, have you?—I cannot tell what the levels were before. I had no data to go upon, and I could not make the statement positively.

3141. You refer to one existing mill right which is required to be affected. You say, "We are of opinion that, with one exception, the whole of the existing mill rights have been left unaffected, as in most instances has been proved." What mill right was that?—That is New Hincksey paper mill. We proposed to make a new cut from above Botley Bridge, to take the water down to below

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below Ifley Reach; there is a small mill upon the line of that cut.

3142. Practically, do you think there is much damage done by the action of the millers?—If the sluices were large enough, and were under proper control, I do not think the millers could affect the water.

3143. As the arrangements are at present, which you consider defective, much injury is done to the interests of those on the river, through this action of the millers?—Certainly.

3144. You are confident of that?—I am confident of that.

3145. In the event of the scheme which you prepared being carried into execution, what effect would that have upon the land below Bells Lock?—To some extent in great floods it would discharge the water a little quicker. I do not think it would affect them much.

3146. The whole of your works would not effect any very considerable improvement in the state of the navigation?—No, I did not understand your question, I thought you asked what effect it would have upon the river below.

3147. On the land below Day's Lock?—We should not improve the land below Day's Lock.

3148. Those lands would not be affected by it?—To a small extent they would be probably in a worse position.

3149. You have got movable weirs and fixed weirs; what is your opinion as to the relative value of fixed weirs and sluices?—For an equal length of fixed weir and sluice in cases like this, the discharging power of the latter is about three times as effective as the former.

3150. Are there any new sluices at any of the locks at all?—There are two well-designed sluices upon that part of the river; there is one above Clifton, at the entrance to the Clifton Canal, and the sluice at Buscot, which, I believe, was built by Mr. Campbell, is also a good one.

3151. That sluice was not built by the Conservators, was it?—I understood that it was built by Mr. Campbell.

3152. At his expense?—I believe so.

3153. I mean that it is not a work which has been put in at all by the Conservancy?—No, I understood not; I may say that the weir at Buscot has nearly as much discharging power as the weir at Ifley, although it only takes one-fifth of the water.

3154. Are those the only two new sluices?—The only two well-constructed sluices.

3155. I suppose that something has been done for the improvement of the others, has there not?—I cannot fix the dates at which they were done, but all the others appear to have been a long time built.

3156. Do you know where Godstow is?—Yes.

3157. What is your opinion about that?—The navigation does not pass by Godstow Lock at present, but gets into the canal above Botley Bridge, and then comes out again at Wolvercot.

3158. The barges go round?—Yes.

3159. Would you propose to close the navigation for barges by Godstow?—I think so, so far as the levels have lead us to think, or to reduce it to navigation for pleasure boats.

3160. Your practical opinion is, after a local inspection, that the works on the upper part of the river are certainly not in a condition of efficiency?—Certainly not above Oxford. They are quite out of repair, and in a bad condition.

Mr. Hall.

3161. What conclusion do you draw from this historical abstract, which you have handed in, from the old records?—That almost all the works which at present exist were constructed before 1802, and a great many of the works then existing have been allowed to fall into decay since, some of which were necessary to the river, I think.

3162. There has been little, if any, new work, and the old work has been allowed to become dilapidated?—There have been only two new works made since 1802 in that part of the river, one was at Clifton Lock, and the other a small lock at Folly Bridge.

3163. When you say "that part of the river," do you mean above Oxford?—I mean above Day's Lock; I have confined my examination to the river above Day's Lock.

3164. But from your report generally, I gather that the whole of the upper part of the river from Day's Lock upwards, is in a very bad and neglected condition?—Well, it is tolerably good as far as Oxford, but above Oxford it is all in a bad condition.

3165. Is it fair to say, that above Oxford the navigation is practically stopped?—I think it is.

3166. I want to ask you about Godstow; did you notice Godstow Lock at all?—Yes.

3167. I think there has been a considerable sum of money spent there?—There has been a new lock built there.

3168. Is that now available for barge traffic, and so on?—No, I think not.

3169. Why is it not?—The water is so shallow on the upper side of it between it and King's Weir.

3170. Then, what is required at Godstow, before this lock can be of any use, is dredging to a large extent?—Yes; I think the sill of the lock should be lowered also.

3171. But is this lock at Godstow, which has been lately erected at a considerable expense, practically useless for navigation?—Yes, I think it is.

3172. Has your attention been drawn to Medley Weir at all?—Yes, I have seen Medley Weir.

3173. Will you tell the Committee what are the arrangements of Medley Weir?—There is an opening of 36 feet for the navigation; then there is a construction, of about 90 feet wide, of timber paddles. It was described by Mr. Mylne in 1802 as the most extraordinary establishment that he had ever seen; he describes it as consisting of gates 33 ft. 8 wide, an overfall of stone of 40 ft. 10, and an oak weir 28 ft. 9.

3174. There has been a great deal spent upon it lately, has there not?—I am not aware.

3175. Is it now in as good a condition as a weir with modern improvements, and so on, ought to be?—I do not think that it affects the navigation much.

3176. Did you particularly notice Sandford?—Yes.

3177. Will you tell the Committee about Sandford; the overfall has been extended, has it not?—I am not in a position to tell; I can tell the length of overfall, but I am not in a position to tell what works have been done lately.

3178. You can tell the Committee what works want doing?—I can.

3179. Will you tell us that?—Sandford Weir wants to be repaired in the first instance, and  
wants

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wants to be considerably increased in sluice power. It requires an additional sluice area to pass 100,000 cubic feet of water per minute.

3180. And the cost, I think, is included in the estimate you gave?—Yes.

3181. Then increasing the overfall, which has been done lately, is not sufficient?—No, for the length of overfall you get a comparatively small advantage compared with a sluice.

3182. Do you recollect noticing anything with regard to Abingdon Weir?—I remarked that the crest of the weir has been raised upon two different occasions, once by stones; that appears to have been done a great many years ago, and then there has been a second lift of the crest of 9 inches done in timber, which appears to have been quite recent, because the timber has not been there very long, and that has been done to the detriment of the drainage very considerably.

3183. The detriment of the meadows above, you mean?—Yes, it was a much cheaper process than dredging the river above.

3184. What ought to have been done would have been to dredge the river instead of raising the sill at Abingdon Weir?—Certainly.

3185. I think you recommend that in some places weirs should be done away with, do you not?—I have already corrected that. Some of the weirs certainly should be done away with, but I have corrected the statement that we made about the weirs, because having made a section of the bed of the river as far as our information allowed, I have come to the conclusion that for the purpose of keeping up the water in summer it will be necessary to restore two weirs that have been allowed to fall into decay.

3186. Were those two included in the eight that are taken away?—Yes, they are two of those.

3187. And they want to be restored, do they?—Yes.

3188. Now, the accounts which have been handed in show a sum of 900 *l.* spent in dredging from Day's Lock to Lechlade; I suppose that is a mere drop in the ocean compared with what is necessary?—£. 45,000 is what we consider necessary for dredging and excavating.

3189. Should you say, looking at the matter as a civil engineer, that the money which has been spent at Godstow, which according to you is of little or no use, and at Medley, and other places,

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would have been better employed in dredging? —I do not know what has been done at Medley. The weir appeared to me to be in very much the same condition as it was 70 years ago; of course I am not speaking from recollection of it, but from the reports which were made at that time.

3190. And as far as the others are concerned, what do you say?—I think that Godstow Lock is of no use at present.

3191. Are you aware that nearly 500 *l.* was spent there?—No, I am not.

3192. I see that the total amount of your estimate comes to 88,000 *l.*, and out of this you seem to think that the Thames Conservancy might fairly be called upon to pay 11,000 *l.*; upon what ground do you base that suggestion? —That refers to the lower part of the river, and that was the estimate, I think, that Messrs. Beardmore and Leach made of what the Conservancy ought to subscribe towards the improvement that they proposed at Oxford.

3193. Had you navigation in your mind, as against drainage, when you made the report?—Yes, that has reference to the part of the river between Oxford and Day's Lock.

3194. Do you consider it wise that two authorities should have jurisdiction, although not quite the same jurisdiction, over the same district? —I should think it would be very desirable to have the whole authority in one hand.

3195. From Lechlade to Day's Lock?—Yes.

3196. Had you any means of hearing or ascertaining the feelings of riparian owners when you were making this report?—I had not.

3197. And you had no means of judging whether, if that part of the river were in the hands of the Drainage Commissioners, greater satisfaction would be felt throughout the district?—I had not the means of ascertaining that. I did not meet a sufficient number of the owners to form an opinion of what the general idea was.

3198. You see no reason why the Board should not be able to manage that part of the river economically and to the satisfaction of the owners?—None whatever.

Chairman.

3199. Are you aware of any works carried on by the Thames Conservancy that have increased the height of the river at Oxford and Iffley, tending thereby to increase the floods in that locality?—No, I am not.

The Reverend T. H. T. HOPKINS, called in; and Examined.

Chairman.

3200. Do you reside at Magdalen College?—Yes.

3201. Are you a Fellow?—Yes.

3202. And have you many opportunities of becoming acquainted with the river?—Yes, I have lived on the banks and known the river between Eton and Oxford all my life.

3203. Then you knew the state of the river well before 1866, and since?—Yes.

3204. What remark have you to make as regards the state of the river before 1866, and since that date?—Well, before 1866 very many of the locks were in a very bad, not to say dangerous state; some of the gates had to be opened by tackle attached to them, because they were in such

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order that they could not be opened in the usual way; in some cases there were winches which the lock-keepers had to use to open them; in fact, they were all in a very bad state. Since then very many of them have been rebuilt or repaired; I am not an engineer, of course, but as far as my observation goes, it would seem that the work had been done in a very satisfactory and effectual manner; in many cases there are concrete sides with granite copings, and so on. Of course I am speaking simply as an ordinary observer; but it seems to me that in going down the river I meet with far less obstruction than I used to. With regard to the upper river, above Oxford, I traversed it before that time, and I have traversed it

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it since. In fact, within the last two months I have been twice down from Lechlade to Oxford. In 1865, I think it was, looking back to my log that I generally keep, I find I was 10½ hours coming down by boat from Lechlade to Oxford. On the last two occasions I came down in the same kind of boat, perhaps with rather a better stream, and I only took something over eight hours doing it; that I think would effectually show that as far as boat traffic is concerned the condition of the river has been very much improved between Lechlade and Oxford; I can say nothing, of course, as to barge traffic.

3205. Do you happen to know Abingdon Weir?—Yes.

3206. Have you noticed any alteration there of late years?—There has been a good deal of new work there, but I could not say what alteration has been made.

3207. Can you describe the nature of that new work?—Well, as far as I recollect, there is a sort of overflow-weir built in steps, and in the middle a considerable opening with sluices, which are drawn in flood time; but I could not tell you anything about the levels, as I have no opportunity of knowing them.

3208. You are not aware that the sill of that weir has been raised of late years?—No, I know nothing about the level.

3209. The Thames Conservancy, having the whole control over the river with the Drainage Commissioners carrying out their works, subject to a veto from the Thames Conservancy, the powers of the Thames Conservancy being increased as far as regards mitigating floods; can you suggest any improvement upon that jurisdiction?—I think the two bodies might work harmoniously enough together. Of course, the Thames Conservancy would have to supply the Drainage Commissioners with levels, and would not after doing so be allowed to raise the level of part of the river anywhere, as that would destroy any work which the Drainage Commissioners were doing; but granting this, I do not see why the two bodies should not work together very well.

3210. Do you consider that the Commissioners have taken due steps, and have shown due diligence in arranging for the carrying off of the flood water?—I do not think that the measures adopted for carrying off flood water have been effectual; but when you ask me whether the Conservators have shown due diligence, if I said they had not shown due diligence, I should be seeming to throw blame upon them which they do not deserve. I think that works ought to have been executed for carrying off the flood water more effectually. I believe the Conservators were prepared to execute certain works, but were prevented from doing so by the fact of an agitation being got up against them, which put the power of drainage into other hands.

3211. Are you a member of the Thames Conservancy?—No, I have nothing to do with it.

3212. Have you any suggestion to offer the Committee as regards the management of the river, or any alteration in the management?—No, I think not; I think we want more sluice accommodation at Iffley; but I see no reason why the Thames Conservancy should not put in the sluices just as well as anybody else, if they have the means and power of doing so; and I also think it is extremely desirable that the

Chairman—continued.

Thames Conservancy should obtain more power over the millers than they have at present; they have at present, as I understand their powers, the power of drawing the sluices as soon as the water reaches a certain point, which is called high-water mark. In my opinion, they ought to have the power of drawing these sluices long before that time; after a certain quantity of rain has fallen in the higher part of the river, they ought to have the power of raising the sluices before the river begins to rise; the floods would then have an empty channel to come into, instead of a full one.

3213. Have you noticed any alteration in the state of the river between Oxford and Iffley of late years?—No, I have not, except that I think that the summer level has been a little raised. My impression is that a somewhat higher board has been put on the overflow sluice near Iffley.

Mr. Cartwright.

3214. Have you any connection with the interests that abut on the River Thames, personally?—No, I have no personal connection.

3215. Your experience, then, is simply that of a gentleman who lives on the banks of the River Thames, and is fond of boating?—Yes, as a college we have some considerable interest in the land drainage above Oxford by Northmoor, but I am not entitled to speak about it.

3216. You complain of the want of sluice power at Iffley?—I think we want more.

3217. The increasing and enlarging of the sluice power depends upon the Conservancy?—It depends upon the Conservancy. When I say at Iffley, I do not mean to say that the sluices need necessarily be at Iffley itself. There are three main carriers from the upper river; namely, a back stream which never comes through Oxford at all, and which might of course be utilized; a stream which branches off at what we call the Gut; and the Iffley branch.

3218. You complain of the works, which would depend on the Conservancy to carry out?—I think they could do so.

3219. You think that the Conservancy should have greater power over the millers?—I think so.

3220. Do you know that that evidence is in direct contradiction to the evidence which has been given on behalf of the Conservancy, by the Chairman?—I heard Sir Frederick Nicolson state that.

3221. Then, in point of fact, the evidence that you give is rather against the Conservancy than in favour of it?—No, I should not say that.

3222. But you complain greatly of the works at Iffley not having been carried out, which are within the powers of the Conservancy to execute?—That is the case.

3223. Is it not your wish for certain works to be carried out at Iffley which it was perfectly competent for the Conservancy to have executed?—Yes.

3224. And you complain of action in reference to the mills, which action the Conservancy, as Sir Frederick Nicolson says, had ample powers to take?—I think you a little misunderstood me; referring to my previous Answer (to Question 3213) I said, I think it is only in summer that the level is at all altered; it has been raised in summer, to the great benefit of the river.

3225. Yes,

Mr. Cartwright—continued.

3225. Yes, but you think that the Conservancy should have greater power?—Yes, I think so.

3226. Sir Frederick Nicolson, speaking on behalf of the Conservancy, says: "The whole of the weirs in that part of the river were transferred entirely to us; the object of that was to take the whole of the control of the weirs away from the millers. Questions have been asked me as regards what the millers should do to prevent the increase of floods. I believe what they could do is almost infinitesimal," so that with his experience he considers that the Conservancy has already got the whole of the weirs under its control?—Yes, I see that.

3227. There is that contradiction: your views are that something has happened which, according to the testimony of Sir Frederick Nicolson, might have been prevented, because the Conservancy already has ample powers for doing it?—Of course.

Mr. W. H. Gladstone.

3228. Is it your experience, on the whole, that the state of the river as to the depth of water has improved year by year?—I think it is better than it used to be; I only go in a rowing boat, so that I could not speak as one who went on board a steamer drawing three or four feet of water; but certainly the locks are better than they were ten years ago, and there is evidently more care taken about the river than there was ten years ago.

Mr. Hull.

3229. This trip which you made from Lechlade upwards was made in a pleasure boat, I presume?—Yes, in a rowing boat; I can say nothing about barge traffic.

3230. The general complaints which you have heard have been with regard to navigation, have they not?—Yes, perhaps so.

3231. We have not had many complaints with regard to pleasure boats?—No, I think not.

3232. I think you stated that it took you ten hours, eight years ago, to go down, and eight hours this year?—Yes, roughly speaking.

3233. Did you notice any special work to which you attribute the greater speed?—It is the doing away with the weirs; in those days there were 14 weirs, and I think there are six weirs now.

3234. Doing away with those eight weirs?—Yes.

3235. You are aware that there was considerable doubt in the minds of some witnesses as to the

Mr. Hall—continued.

advantage of those weirs being done away with?—Yes.

3236. But you wish to testify, as far as your experience goes, that they have been an advantage to pleasure boats?—Distinctly an advantage, I have not a doubt of that.

3237. If not to the navigation?—Yes; I do not wish to say anything about that, I know nothing about it.

3238. Did I understand you to say that you think it of very great importance that that part of the river should be subject to one control, because if subject to two controls, the Thames Conservancy could raise their level, and thus do great damage to any work which the Drainage Commissioners were doing as Drainage Commissioners?—I did not say exactly that; I said that I thought there was no reason why the two bodies should not work harmoniously together, but I laid it down as a *sine quâ non* that the levels should be maintained; that the Thames Conservancy, supposing them to exist as a separate body from the Drainage Commissioners, should say what levels they wanted for the maintenance of water for navigation, and should not alter those levels afterwards, otherwise they might undo work which the Drainage Commissioners had done; but granting that, I do not see why they should not work very well together.

3239. So that you apprehend considerable damage to work of public usefulness, supposing they did not work harmoniously together?—Supposing they did not; but I say, granting that certain levels are to be maintained, there would be no question of working harmoniously or inharmoniously. If the Conservancy did not maintain these levels; if they put on a foot to Sandford lasher, or any other lasher, the Drainage Commissioners would say you have no power to do this, you must take it off again.

3240. Does not that tend to show that the drainage power and control of the arterial drains ought to be in one hand?—Not necessarily, I think.

3241. Still you admit that you see great danger to works of great public usefulness from a possible discord between these two bodies?—Not with the proviso I have laid down.

3242. If you grant that premise; but if you start with a *tabula rasa* you will grant that there is great danger?—Certainly; but I do not start with a *tabula rasa*, I think it would be very foolish to do so.

Mr. ROBERT S. HAWKINS, called in; and further Examined.

Chairman.

3243. You are desirous of giving some further evidence in addition to that which you have already given, with reference to certain proposals for the future government of the river, passed at a meeting of the Thames Valley Drainage Commissioners held on the 9th of June?—And the dates and particulars of their meetings in reference to that as well.

3244. That you put in the other day; what other evidence have you to tender?—There is one thing which I think the Committee a little misunderstood, and which I wish particularly to put before them, that is, that the first Commissioners had no power whatever to do works; that where

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Chairman—continued.

they did any works it was simply a stretch of power on their part, and that before the Drainage Boards and the New Board of Commissioners were elected in September 1876, it was practically *ultra vires* for them to have done any works at all; and I wish to call the attention of the Committee to the sections of the Act under which I show that. The constitution of the Commissioners was that there were certain Commissioners named at first, whose duty it was to ascertain the limits of jurisdiction, settle the numbers of the district boards, make rules for the election of district boards, and to levy a first rate, covering the expenses, and that as soon as that was done they were to

Rev. T. H. T. Hopkins.

29 June 1877.

Mr. Hawkins.

Mr.  
Hawkins.  
29 June  
1877.

Chairman—continued.

to go out of office. The words of the Act are, "The Commissioners to be elected by the district boards shall come into office on the first day of the month next ensuing that in which the first election of the members by the district boards may be ordered to take place, and upon such Commissioners so coming into office, the powers, right, privileges, and duties of the first Commissioners shall cease, and be transferred to the new Commissioners, who shall thenceforth, subject to the provisions hereinafter contained, for retirement by rotation, and to the other restrictions contained in this Act, be the Commissioners for carrying this Act into execution." Therefore the first Commissioners had really no right to go and enter into works at all, and it was simply a sort of stretch of power in one of two instances when they attempted to do these works. One particular instance where they attempted to do something, was with regard to Sandford Mill. When Sandford Mill was burnt down, which was in 1873, they thought that a favourable opportunity occurred for obtaining a lowering of the level, and they applied to the owner of the mill at Sandford, and they also wrote to the Secretary of the Thames Conservancy a letter which I will read: "Sir,—I am directed by the Commissioners under the Thames Valley Drainage Act, 1871, to ask if the Conservators will be willing to aid them in obtaining a lowering of the mill at Sandford. The proprietor, Mr. Kitchen, has expressed his willingness to entertain a proposal to lower it some inches, but before treating further the Commissioners desire to ascertain if the Conservators concur, and also having regard to the navigation, what stipulation they would wish to make with regard to the reduction of level. —I am, Sir, your obedient servant, R. S. Hawkins. To the Secretary of the Thames Conservancy." In reply to that the following letter was received: "Sir,—Referring to your letter of the 12th ultimo, I have to request that you will oblige me by forwarding a plan and section of the lowering of the mill sill at Sandford, as proposed by the Thames Valley Drainage Commissioners.—I am, Sir, your obedient servant, E. Burstal." The answer which was written to that is this: "13th May. Sir,—I am instructed by the Thames Valley Drainage Commissioners to inform you that all the Commissioners propose to do is to arrange with the owner to lower the sill of Sandford Mill not less than 4, nor more than 6 inches; such reduction to be of any use should be followed by the reduction of level to the same extent of Sandford Weir and lasher; they think that with this information, the Conservators having in their possession all plans, sections, levels of the river and works at above and below Sandford, will be able fully to judge of the effect of such a reduction of the level.—Yours truly, R. S. Hawkins." There is a letter before that of the 3rd of May, from the Conservancy, dated the 23rd of April, which came first, "Thames Conservancy (Engineer's Office), 41, Trinity-square, Tower-hill, E.C., 23rd April 1873.—Dear Sir,—I have to report to the Conservators on your letter of the 12th instant, on the subject of lowering the mill sill at Sandford. Before I can give an opinion it is necessary that I should know the extent to which it is proposed to lower the sill, and I therefore write to ask whether any plan has been proposed showing the extent of such lowering; the idea, I presume, is to gain increased

Chairman—continued.

water-way for the discharge of floods. The mere lowering of the mill sill may have very little influence in this respect, or on the navigation generally, but if the alteration be considerable, its effect on Iffley Lock and on the intermediate part of the river will have to be considered; may I therefore ask you if there is any such plan, and if so, whether if I call at your office next Saturday, I can see it.—I am, dear Sir, yours faithfully, Stephen H. Leach. Robert S. Hawkins, Esq." It was then, in answer to that, I wrote a letter of the 13th of May, and there the negotiation practically stopped, and nothing further was done; we tried to get at something with Mr. Kitchen, but we felt that we were really powerless in the matter; the Conservancy gave us no further idea of help in the matter, and there was an end of it. We were in a very awkward position; we had not, as I have said, really the power to raise the money; we felt there was a great deal of difficulty about it, and it could only be by an actual concurrence of that sort that we could have embarked in the agreement to make payments to Mr. Kitchen to lower the mill sill. The next thing I would refer to was the matter of Islip Bridge on the Cherwell, which I did put before the Commissioners. There was another case where we used our influence; that was on the toll bridge at Wolvercot last year, where the county had to rebuild that bridge, and we used our influence to get the position of the water-way of the bridge improved, and the width of the water-way improved. Those are the only cases where we have done works, and we literally had not the legal power to do what we have done, but our anxiety to do it was so great that we overstepped our legal powers in order to do it.

3245. Are you aware that the sill of the weir at Iffley has been raised?—I am not aware.

3246. Are you aware whether the sill of the weir at Abdingdon has been raised?—I have seen myself a large timber balk placed on the top of the sill of the weir there; I saw it last summer.

3247. Is it your belief that that weir has been raised?—I imagine that there is no doubt that it was raised, by the addition of that piece of wood. It seemed to me a not very recent piece of work, because the angles of the wood were tolerably sharp. It was not an old thing apparently.

3248. Have you any further information to offer?—I think these are the points which I wished to place before the Committee.

Mr. Cartwright.

3249. Practically, the Commissioners took the initiative step of suggesting those alterations at Sandford Bridge?—Certainly.

3250. The suggestion was thrown out to the Conservancy?—It was.

3251. And a correspondence ensued if I understood rightly?—Yes.

3252. And the matter was allowed to drop by the Conservancy?—Yes.

Mr. Hall.

3253. Do I understand that the first Commissioners appointed had no power to do any work?—It was to a certain extent a stretch of power to do it, because the intention of the Act was, that as soon as they had got the Boards elected, and as soon as they had levied their first rate to cover expenses, they were to go out of office. That was the principle of the Act, and then the elected Commissioners

Mr. Hall—continued.

Commissioners were to come in, and they were to begin to do the works.

3254. When did they come in?—In September 1876.

3255. There was a delay of five years between the appointment of the first Commissioners and the election of the acting body?—There was.

3256. What was the reason of that?—It arose from the delays in getting the plans from the Ordnance, and the necessary works of getting the limits of jurisdiction approved by the Enclosure Commissioners. There was no delay on the part of the Commissioners, and I believe that the Ordnance did their best to complete the work. Every sort of effort was made to push the matter on, but they were met with all sorts of difficulties, and, finally, with the difficulty that they had to settle the parish boundaries, which were an essential part, and the Ordnance go over that very carefully. They have to advertise their meetings and so on, for the purpose, and the delays were, I believe, perfectly unavoidable. I know, if I could only have shown this Committee the correspondence which took place, and the earnest endeavour to get this work done, there would have been no sort of doubt in the mind of this Committee that the Thames Commissioners were men in earnest in trying to get their work to a conclusion.

3257. Then the present body of Commissioners who are to do any work at all have only been in existence some nine months?—Since September last.

3258. So that practically they have had time to do little or nothing?—They have had time to do little or nothing.

3259. Am I right in supposing that there is a very strong feeling among the riparian owners round Oxford against the jurisdiction of the Thames Conservancy?—I think very strong. I do not think that that arose from any question of ill feeling to the Conservancy, but it is a feeling of this kind; they have an immense interest on all this part of the river; they are residents in the upper district, and they think that they ought to have the control of what are practically the arterial drains, by which alone they can get relief from floods and deal with their own land, and they feel that it is a great hardship upon them, representing the immense interests they do, that they have no power, but have to go to a board which is sitting in London, and whose interests are so small, to ask their leave to do every little thing in this river. They could not even, I believe, cut rushes without asking for their leave in the first instance, and what they feel is that that is not a fair and proper position of affairs for interests so large as theirs, and they think that they ought to have the complete control. They are willing to use it for the benefit of all, but they think that the control ought to be with themselves, and that it is not fair to ask them to travel all the way from Cirencester, and from all the parts of the valley, down to London, to attend a meeting of the Board held in London. My experience is that there is a great deal of difficulty in always accommodating the meetings to the convenience of the Commissioners, even

Mr. Hall—continued.

when the meeting is at Oxford. We try to do as much as we can by letting the upper district manage entirely its own affairs at Cirencester; we have very little interference with it at all, but if you ask us to go right down to London, to Reading, Staines, to Windsor, to look after our own interests, that seeing what the proportion of our interests is to the others, we feel that that is a real hardship, and one which causes a great difficulty. No people know so well where the difficulties and where the troubles arise in their own district as the landowners themselves do. You would never have anything go wrong on the river but that some member of the Board would immediately bring it forward, to see that the matter was attended to, and it is that sort of local management and that sort of local government that they desire on the upper river. They have no sort of ill feeling to the Thames Conservancy, but I do believe that the way to have harmonious action between the bodies is to let us manage our own affairs. We will do everything we can, then, to play into their hands, if they take the lower river.

3260. I suppose you know about the Oxford local board?—Yes.

3261. Will you tell the Committee what is the general feeling of the Oxford local board upon the subject?—I can only say that the feeling of all those I have spoken to is this: that while they would be perfectly willing to contribute, if the board was a board having its sittings at Oxford, and they had representation upon that board, under certain conditions, to the works which were carried out, yet they would have a very different feeling if the work was to be carried out and the money to be raised and spent by a board sitting in London.

3262. Do you consider that they have confidence in the present Drainage Commissioners?—Yes, I do.

3263. Do you consider if, on the whole, the Drainage Commissioners had jurisdiction from Day's Lock upwards, that that would be a fairly satisfactory solution, to the riparian owners and also to the towns upon the banks?—I do.

Chairman.

3264. Do you mean the entire jurisdiction over the river from Day's Lock upwards, similar to the jurisdiction at present exercised by the Thames Conservancy?—That the Commissioners should have added to their present powers the powers which the Thames Conservancy exercise over that part of the river.

3265. Therefore you would divide the river strictly into two parts?—I should divide the river.

3266. And you think that these two bodies would act harmoniously?—I do, far more harmoniously than they could possibly act at present, where they are dealing with the same stream, over the same ground.

3267. You have no doubt upon that point, in your own mind?—I have not the least doubt in my own mind of it. I feel quite confident that that would be the better course.

Mr.  
Hawkins.  
—  
29 June  
1877.



Mr. STEPHEN W. LEACH, recalled ; and further Examined.

*Chairman.*

Mr. Leach,  
29 June  
1877.

3268. SIR FREDERIC NICOLSON promised that you should put in some statement with regard to the dredging?—Yes; from 1874, when the dredging below Teddington was commenced, up to the 25th of April 1877, there have been 131,964 cubic yards of material dredged, at an expense of 8,065*l.* 10*s.* 6*d.*

3269. You were also to give us further information as regards the sills of weirs; have you any statement of facts as regards the sills of the weirs on the river?—I think I should confine myself to the evidence which has been given before this Committee. It has been stated that the weir at Abingdon has been raised; I cannot deny that it has been raised, but most certainly not in the time of the Conservators; that I am sure of.

3270. Well, but we have had evidence that there is new timber?—Not new timber, I think.

3271. What weirs have you raised, have you raised the sills of any weirs?—In one case.

3272. Which was that?—At Temple. There was a distance 24 feet in length which was raised, and the circumstances were that a flood was prevailing in the river at the time that that part of the weir gave way, and it was impracticable to lay the sill at the former level; but that only forms part of the work. There are further repairs which have to be done there, in effecting which we shall be able to give fully 10 times the amount of space that was taken away.

3273. What was the name of the lock which you said you did raise?—Temple Lock.

*Chairman—continued.*

3274. And Abingdon Lock you have not raised?—No.

3275. Sandford Lock?—Certainly not.

3276. Iffly Weir?—No, certainly not. It was also stated by Mr. Dodd, at least I think he must have referred to Romney Weir, that the sill there had been raised about a foot. It has not been raised an inch; in fact it was rather lowered than otherwise when it was repaired. If that were the weir that Mr. Dodd referred to (I am not certain that it was, but I only suppose that it was that weir), that is the state of the case.

3277. You deny having raised the sills of either of these weirs, Sandford, Abingdon, Iffley, or Romney?—Most distinctly.

*Mr. Cartwright.*

3278. When were you last down there?—Not very recently; not for some weeks past.

*Admiral Egerton.*

3279. There seems some doubt about Abingdon; was anything done to it?—Not by the Conservators, most certainly.

*Chairman.*

3280. Who else could that have been done by?—I cannot conceive that anybody could have ventured to meddle with it, because it is now the property of the Conservators.

*Friday, 13th July 1877.*

## MEMBERS PRESENT :

Mr. Coope.  
Colonel Carington.  
Mr. William Cartwright.  
Admiral Egerton.  
Mr. William Henry Gladstone.  
Mr. Hall.

Sir Trevor Lawrence.  
Mr. Charles Praed.  
Mr. Richardson-Gardner.  
Sir Charles Russell.  
Mr. Samuelson.  
Mr. Walter.

OCTAVIUS EDWARD COOPE, Esq., IN THE CHAIR.

Mr. CHARLES MOSTYN OWEN, called in; and Examined.

*Chairman.*

3281. You are the Chief Constable of Oxfordshire?—I am.

3282. Are you residing in the neighbourhood of Iffley?—Not at present. I did live there for two years. I have land there now.

3283. Are you aware of any alteration having been made of late years in the weir at Iffley?—Yes; I suppose you mean what we call the lasher?

3284. Will you describe the nature of that alteration?—There are balks put across it to raise the water; what we call in that country a balk is a piece of wood.

*Mr. Walter.*

3285. Of what height?—In one lasher, namely, at the Wires, it is about 20 inches.

*Chairman.*

3286. You are speaking of the lasher now, not the weir?—I think you refer to the same thing that I do; we call it there a lasher, you call it here a weir.

3287. A lasher is merely the Oxfordshire name for a weir?—Yes.

3288. You consider that the height has been raised 20 inches above what it was before?—I will not say as much as 20 inches.

3289. How much do you think it has been raised?—I say from 14 to 18 inches.

3290. When was that done?—I cannot tell you the exact date when it was done, but the time when I first complained of it was in 1875; I wrote then.

3291. To whom?—I wrote to the Thames Conservancy Commissioners, and I have a copy of my letter here (*producing a letter*).

3292. What was their reply?—I have it here (*producing another letter*).

3293. When did you write your first letter?—I have not a copy of my first letter, but what I have here is a copy of my second letter.

3294. This is dated the 28th May 1875; had you not had correspondence previously to that?—Yes; I had had correspondence previously to that, but I have not kept a copy of it.

3295. Have you a copy of their letter of the 27th of May 1875, of which you acknowledged  
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*Chairman—continued.*

the receipt in this letter?—No, I have not got it here. Mr.  
C. M. Owen.

*Mr. Cartwright.*

3296. Have you got it at home?—No, I have not. 13 July  
1877.

*Chairman.*

3297. Then this correspondence is not all the correspondence which has taken place?—No, there were two letters before that, certainly.

*Mr. Samuelson.*

3298. Do you remember the purport of the two previous letters?—I wrote to complain that the water had been put on to my meadow about a foot high, and ruined my hay crop.

*Chairman.*

3299. At what time did you write that letter?—That was previous to that correspondence which I have handed to you.

*Mr. Samuelson.*

3300. Was it in the same year?—Yes, in the same year; I should think within a month of that time.

3301. Do you remember the purport of the reply you received?—The purport of the reply was that the water-mark had been a fixture, and that no alteration had been made in it since 1866. Then I replied to them again.

*Chairman.*

3302. And this letter of the 28th of May is your reply?—Yes.

3303. I understand you to say that the Thames Conservancy stated that they had made no alteration in the water-mark since 1866?—Yes.

3304. Or in the height of the lasher?—They said they had made no alteration in the water-mark; they said nothing about the lasher; the one would follow from the other. The water-mark, as I stated in that letter, was not a fixture; it was moveable, it was on a piece of board.

3305. Did they not also state that they had not altered the height of the lasher?—No, the lasher was not mentioned.

3306. It was only with reference to the water-mark?—That is all.

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3307. This

Mr.  
C. M. Owen.  
—  
13 July  
1877.

*Chairman*—continued.

3307. This is your reply: "I beg to acknowledge the receipt of your letter of yesterday's date. With reference to the high-water mark which you state is fixed above the lock to regulate the level of the water, I call your attention to the fact that when I last wrote to you, this so-called high-water mark was not a fixture, but was merely a piece of cast-iron nailed on a bit of old board, moveable by a child of six years old. So far as I know it is still in the same condition. I have lived at Ifley close to the river for some time, and can assure you from my own personal knowledge during the summer, and without any excuse of flood, that the water of the river there has, both last year and this, been raised quite a foot above the usual level. I cannot say whether this has been done to facilitate the transit of steamers and large boats through this part of the river, which has been gradually filled up with Oxford sewage, or whether it happens through the carelessness of your lockman; but it has certainly done much damage to both my neighbours and self, and if it is repeated, I for one will most certainly enter an action for damages against the Thames Conservancy?"—Yes, that was my letter.

3308. Did you receive any reply to that?—I got a civil letter in reply, saying that they would attend to it. I have not got that letter; I have nothing from that time down to 1877.

3309. Did you write to them again?—Yes, I wrote to them again on the 8th of May 1877.

3310. But you wrote to them before that?—I wrote to them in 1875; you have read that letter.

3311. Had you no further correspondence with them after that time until 1877?—I do not think I corresponded with them any more until 1877.

3312. Did you not furnish Mr. Hall with this copy of the correspondence that I have before me?—Yes.

3313. Then it appears that some further correspondence did take place in September 1875?—I gave him all the letters that I had to copy.

3314. Then it appears that what you have handed to us is not the whole of the correspondence which took place?—No, it is not the whole; there were some letters which I did not keep, others I did keep.

3315. I see that the letter of September 1875 is one which was supplied by Mr. Hawkins; probably you know nothing about it?—I do not.

*Mr. Samuelson.*

3316. You had nothing to do with it?—No.

*Chairman.*

3317–18. Your letter of the 8th of May 1877 is this: "I beg again to call your attention to the very great damage done to meadows occupied by myself and others on the banks of the Thames, in the neighbourhood of Ifley, by the way in which the water has been raised during the last two years. We are prepared to prove beyond doubt that your water-mark has been raised at least 12 inches, and although the river is of itself now low, the water is thus forced on our meadows, and renders them worthless either to graze or mow for hay. We shall be glad to meet you, and whom you may appoint to investigate this our complaint; but although we are anxious to avoid legal proceedings, we are quite determined not quietly to be swamped by the wilful acts of your

*Chairman*—continued.

Thames Conservancy. An early answer will oblige." Have you the answer to that?—Yes, it is dated the 11th of May: "I beg to acknowledge the receipt of your letter of the 8th instant, and to inform you that the same shall be laid before the Conservators on Monday next. In the meantime I may state that nothing is known here of any alteration in the position of the water-mark at Ifley Lock."

3319. Have you your reply to that?—Yes (*handing in a letter*).

3320. This is dated the 12th of May: "In reply to your letter of yesterday's date, in which you state that nothing is known in your office of any alteration of the position of the water-mark at Ifley, I beg to call your attention to my letters to you of the 11th and 28th of May 1875, complaining that your water-mark at Ifley had been raised at least a foot, and much damage done to adjoining meadows in consequence. To these letters I received polite answers, but no redress; we are not disposed to tolerate a continuance of such treatment?"—Yes.

3321. Have you had any reply to that?—I received a civil answer, acknowledging it.

3322. Nothing else?—No; we offered to meet them.

3323. Have you any evidence to offer to the Committee as regards the change in position of the water-mark?—Yes; I am prepared to give you evidence upon that, and there are two other witnesses here.

*Mr. Walter.*

3324. Have you any plan or section of the structure of the weir?—No; but, as I stated in my first letter, the water-mark was moveable, when they said it was a fixture; and now, since 1875, they have not only taken that water-mark away, but they have moved it to the other side of the river; they have completely altered the place of it; it has changed sides.

3325. Will you describe what the water-mark is, because a water-mark may mean a good many things?—The water-mark is now a piece of iron leaded into a stone, and permanently placed on a part of the lock.

*Sir Trevor Lawrence.*

3326. It is immovable?—Yes, it is immovable now, but in 1875 it was moveable; it was on a piece of board; you could take it up and down.

*Mr. Walter.*

3327. What does the water-mark do besides indicating the height of the water; has it any effect in raising or lowering the water?—No; but when they raise it up to high-water mark now all our fields are under water.

*Mr. Samuelson.*

3328. What is the water-mark intended to indicate?—The height to which the Thames Conservancy may put the water, as I understand it.

*Mr. Walter.*

3329. What means have they of "putting" or raising the water?—They do it by means of those lashers.

*Chairman.*

3330. That is to say, they board up the top of the weir?—Yes, by what we call a balk.

3331. Have

*Sir Trevor Lawrence.*

3331. Have you taken any levels; you say that the water-mark has been raised; of course, the only mode of ascertaining that is by taking accurate levels, so as to compare its present position with its former position; have you taken accurate levels, or employed anybody to take accurate levels for the purpose of ascertaining whether it has been raised or not?—It is a matter of fact; and we know it without taking any levels, because we know that formerly when the river was up to the water-mark our fields were dry, and now if they put it up to the water-mark our fields are flooded; they are under water. Mr. Alden, who is ready to give evidence, has held land there for 50 years, and he will tell you the same.

3332. It has been stated to us that some land which formerly was flooded is not now flooded, and that other land which formerly was not flooded is now flooded?—I do not say that.

3333. We have had evidence to that effect from various witnesses?—Our land was not flooded until about 1874; that was the first year that I complained of it. I have known the place for 20 years.

3334. You arrive at the judgment that the level of the water-mark has been raised, from the fact that certain fields have been flooded?—Yes, certainly.

3335. Not from any measurements?—No, not from measurements.

*Chairman.*

3336. Have you seen any new timber on the top of the lashers?—I have; there are new timbers there now.

3337. Have you any idea by whose orders they were placed there?—I know who placed one there, for he told me so.

3338. Who was that?—Reeve, the lockman; he is their servant.

3339. Did he state by whose orders he had placed it there?—He did not; he told me that he should get the sack if he said much; he was an unwilling witness, but he acknowledged in the presence of another man that he did put it there.

3340. I gather from you, that it is your opinion that this man did the work of raising the lasher by the orders of his employers, the Thames Conservancy?—Certainly.

3341. I asked Mr. Leach, have you raised Iffley Weir, and his answer was, "No, certainly not. It was also stated by Dr. Dodd, at least I think he must have referred to Romney Weir, that the sill there had been raised about a foot. It has not been raised an inch; in fact, it was rather lowered than otherwise, when it was repaired." The next question was, "You deny having raised the sills of either of these weirs, Sandford, Abingdon, Iffley, or Romney;" and his answer was, "Most distinctly." That is the evidence given by Mr. Leach, the engineer for the Thames Conservancy?—It is not correct.

3342. Is it still your opinion that the orders were given by the Thames Conservancy to raise the height of the Iffley lasher?—I am positively certain that it has been raised. There it is; and Reeve, the lockman, acknowledged that he had done one, and he would not tell me about the others for fear of getting into a scrape; I have no doubt that he did the lot.

O.114.

*Sir Trevor Lawrence.*

3343. Is this new timber which you have spoken of timber which has been used to repair the lasher?—No, it is not for repairing; it is put in there, and sometimes it has been taken out; in a very high flood in the winter they have taken it out; it is there now.

3344. It has nothing to do with the paddles of the lasher?—I do not understand what you mean by paddles.

3345. The gates of the lasher; does the lasher contain any apparatus by which the water can be allowed to pass through it?—If you took up the balks the water would be allowed to pass through it.

3346. The balks are moveable planks?—Yes.

3347. Your allegation is that a new plank has been placed on the top of the old planks, by which the level of the water has been raised higher than it was before?—Yes. There is a sill of the weir or lasher, as we call it, and the proper height of the river is the height of the sill of the lasher; but, in consequence of the river having become full of Oxford sewage, and so forth, in order to keep open the navigation they have raised the water instead of dredging the river, and in that way they have swamped the lands at the side of the river.

3348. What I want to know is this: do you make a distinct statement that these timbers are not new timbers placed there to replace old ones, but are new timbers placed there, irrespective of any necessity for repairs, for the purpose of raising the water in the river?—Yes, it is no repair at all.

3349. You state that distinctly?—Yes, positively.

*Mr. Cartwright.*

3350. You said that the year 1874 was the first period when your land was flooded, or flooded to such an extent that you had reason to complain?—Yes, my crops were utterly spoilt.

3351. In 1874?—Yes. The day before my hay was to have been cut, they raised the water to the highest possible level; the gentleman was coming, I forget his name, who comes in the big steamer, which comes down at I do not know how many miles an hour, and flushes out the water on both sides. The consequence was that there was a flood of water in our meadows.

3352. What steamer do you mean?—The steamer which Captain Etheridge goes up and down in: it belongs to the Thames Conservancy, I think; I know that it has done us hundreds of pounds damage.

*Chairman.*

3353. Is it a paddle-steamer?—I do not know, I am sure, whether it is a paddle-steamer or a screw. There is one steamer that carries passengers, which goes up as far as Oxford.

*Mr. Cartwright.*

3354. When did you see it last?—I have seen it within a month.

3355. How often have you seen it?—I lived at Iffley for two years, and I used to see it very frequently then.

3356. Can you give us any idea of how many times a year you have seen that steamer?—I have seen it going up and down 20 times.

3357. During how many years?—I do not recollect seeing it at all until I went to live at Iffley,

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Mr. Cartwright—continued.

Iffley, and that was in 1871; I lived there for two years, and I saw it very frequently then.

3358. Is it employed for towing, or what?—It appears to me to be used for recreation.

3359. You say you have seen it within the last month?—Yes, within a month.

3360. Do you know what party was then using it?—No, I was not on board, I cannot tell.

3361. When was your meadow last flooded?—I was there on Friday last, that is to say: Friday, the 6th of this month, and Saturday, the 7th, and Sunday, the 8th, and all those three days the river for some reason or other was kept high, probably for those boats and for the steamer to get along.

3362. For the steamer last week?—I was speaking of last week, and there was a steamer, but I do not think it was that steamer.

3363. The water was kept high for that steamer?—I cannot say for that steamer.

3364. For a steamer?—For some steamer, for boats.

3365. Was your meadow then flooded?—I was.

3366. But the river is not high now?—The river is low, but the last time I was there, that was last Sunday, I saw that my meadow and a neighbour's meadows were all flooded. I went up to the lock and called the lockman's attention to the fact that our meadows were flooded, and I saw that the water was not within four inches of the water-mark then.

3367. The river was not at that time within four inches of the present water-mark, and yet your meadows were flooded?—Yes.

3368. Was it Reeve to whom you spoke then?—Yes.

3369. The same lockman?—Yes.

3370. Have you any objection to saying when it was that Reeve made that statement which you have alluded to, that he might be sacked if he told you; how long ago was it?—He said last time that he should get into trouble; he has told me many times not to draw him into it, or he should get into trouble.

Chairman.

3371. When was the last time that he told you so; about how long ago was it?—Within a fortnight. The last time he told me so was when I called his attention to the extra balk which was put in within the last two years at the Wires lasher.

Mr. Cartwright.

3372. That was another one?—Yes, an extra 9-inch balk was put on the top; I said, "who put it on?" and first of all he equivocated, and then he said, "I put it, and the miller would never let me take it off afterwards."

3373. Has this man been lock-keeper at other lashers besides?—He has been there for a good many years; I cannot tell you how long.

3374. Has he more than one lasher under his care?—There are three lashers between Iffley and Oxford.

3375. They are all under him?—I believe so.

3376. You do not know how long Reeve has been there; how many years have you known him to be there?—I have known him to be there since 1870. It was at the end of 1870 that I went to live at Iffley, and then I became more aware of these things.

Mr. Cartwright—continued.

3377. You can testify in the most explicit manner to the balk at Iffley, and you know something about the balks at other lashers?—At two other lashers.

3378. Which are those two?—One is the Wires lasher, where I say they have put a new balk on within the last two years; and the other one they have now put balks on, which I never saw before, is between Iffley and the Wires.

3379. When was that?—I never saw balks there until last Sunday.

3380. Have you often been there?—Yes, very frequently.

3381. Did you say that your attention had been drawn to that lasher within a given time when there was no balk there?—No, I never noticed the lasher before; I saw the wood was new, and I never saw it there before.

3382. You have been resident in Oxford for a good many years, and are very well conversant with what goes on there?—Yes.

3383. Have you seen the Thames Conservators often at Oxford?—I have never seen anything but this boat, which causes the floods, myself.

3384. They have, of course, jurisdiction over the river there; is it at all within your knowledge that they have been up and transacted business there and personally inspected the river?—Not to my knowledge. They have never dredged the river, nor laid out a half-penny upon it between Oxford and Iffley, to my knowledge.

3385. I suppose if the Thames Conservancy was in the habit of coming up to Oxford often, you would be likely to know that?—I never heard of their being there.

3386. We have had it stated in evidence, on the part of the Thames Conservancy, that they have gone up twice a year and transacted business there?—I heard that they had said that they had gone as far as Lechlade, but they cannot go so far.

3387. Why cannot they go so far?—It is impossible to go up in that steamer.

3388. They do not say that they go up in a steamer, but they say that they habitually go up there twice a year?—I dare say they do; I never saw them, nor did I ever hear of it.

3389. You never heard of their having any conference with any one in an official position at Oxford?—No. In one of my letters I asked them to meet us, and talk over this matter.

3390. In what letter?—I said, "We shall be glad to meet you, and whom you may appoint, to investigate this our complaint."

3391. What is the date of that letter?—The 8th of May 1877.

3392. But we know that Mr. Leach has been up at Oxford since, because he stated to us in evidence that he had been there a short time ago?—He may have been there; I did not see him.

3393. When Mr. Leach went up he did not take any steps to meet you, or any one, with reference to this matter?—No.

3394. At all events, it is a fact that on the 8th of May you asked to have a conference with the Conservancy; now the Conservancy say that they habitually go up twice a year, and Mr. Leach has been there since, but you have not seen any of them?—No; they have not been near me, nor anyone who is with me in this matter.

Mr. Cartwright—continued.

matter. The memorial that we sent up was signed by the whole of the landowners and inhabitants of Iffley.

3395. What memorial?—We sent in a memorial to the House of Commons.

Chairman.

3396. A petition?—Yes.

Mr. Cartwright.

3397. What I am distinctly to understand is, that last Sunday, although the river is at the present moment low, your meadows were flooded in consequence of the intervention of this balk?—Yes; further than that I did not see it myself, but the next witness will tell you that on Monday one man's field was flooded, so that his hay was floating about his field after he had cut it and half made it. It was on Sunday that I was there last, but that occurred since then; it was on Monday. I was not there myself at the time, and I cannot speak to it from my own knowledge.

3398. Can you tell me whether your meadows are above or below high-water mark?—They are below high-water mark now; whenever they put it up to high-water mark, our meadows are under water; they are flooded. As I have already told you, on Sunday last it was four inches below the water-mark, and still our meadows were flooded.

3399. What you say is, that last Sunday the water was four inches below high-water mark at the lasher, and yet your meadows were flooded?—Yes.

3400. And in former years that was not the case?—Never, until the water-mark was raised.

3401. Do you mean to say that the water could be kept up to the water-mark in former years, and yet your meadows still remain not flooded?—Yes, it came up to the water-mark without hurting us the least in the world.

3402. Up to what year was that?—The first year that I noticed it was 1874; I did not become a landowner there until just about that time; I bought that meadow in 1873 or 1874, I forget which; I noticed it, and complained of it, in 1874.

3403. You bought your meadow in 1874?—I think I bought it in 1873.

3404. And in 1874 you complained?—In 1874 I complained merely to the lockman, of his keeping the water up too high; but I got no redress from him; he said he was bound to do it.

3405. In 1874, if the water was up to high-water mark, did it flood your meadows?—There was no fixed water-mark in 1874; it was on a board, and they shifted it backwards and forwards.

3406. Do you mean to say that at that time it was being shifted according to the state of the water in the river?—It was loose; anybody could shift it. Although the Conservancy say in their letter that it was a fixture, I have got evidence here to prove that it was not a fixture; and not only that, but now they have shifted it from one side of the river to the other.

3407. Have you any record of the condition of the meadow before you bought it?—I have a man here who can tell you about that; he and his father have held the meadow for 30 years.

3408. You do not know whether the meadow was flooded or not before you bought it?—Yes, I do; because I rented it for two years before I bought it, and it was not flooded then.

O.114.

Mr. Cartwright—continued.

3409. That carries you back to 1871?—Yes; 1870 was the first year I think when I had it.

3410. Were there any floods in that year of any considerable amount?—We do not complain of floods; we cannot help a flood; that is an act of God; we complain of their putting up the water at the lasher.

3411. What I want to know is, whether the river was very high at that period at all?—I cannot tell you, but when they put it up to high-water mark now, they flood us whether there is a flood or no.

Mr. Walter.

3412. Does this meadow slope away from the river downwards, so as to be below the level of the top of the bank of the river?—Not properly, not until the water in the river was raised.

3413. The high-water mark may be assumed to be the top of the bank of the river?—It used to be; but now they have raised it higher than that; and since the water-mark has been raised, it has flooded the whole of these fields.

3414. How does your meadow stand with reference to the level of the top of the bank of the river?—It ought to be a foot above it, but when it is high-water, it is below it, and it runs right in; for instance, if these boats are coming down, they raise the water to the high-water mark, and then all these fields are flooded and under water.

Admiral Egerton.

3415. You said something about a steamer doing you so much damage; is that because it helps to send the water over the meadows?—Certainly; when they have got the water up to the highest possible point, and this steamer comes down, it flushes the water of the river over the bank.

3416. Does it send an appreciable quantity on to the meadow?—When the big boat comes up, she will flush a good deal of water over.

3417. You said that the high-water mark was shifted from the one side of the river to the other?—Yes.

3418. What had it been upon before it was shifted; had it been upon any part of the structure of the lasher itself, or upon the shore?—It was near the lasher, but not within 100 yards; it was close to the lock.

3419. On the land?—On the side of the bank; the board with the water-mark on it had originally been a fixture, but it had become loose. When I complained, they said it had been a fixture since 1866, but it had become loose, and then they moved it right away to the opposite side of the river.

3420. And your contention is that when they shifted it, they placed it so much higher, that when the level of the water in the river reaches the high-water mark now, it is higher than it was before the water-mark was moved to the other side of the river?—Certainly.

3421. I think you said that you thought that all the weirs between Iffley and Oxford had been raised?—Yes, three of them certainly.

3422. Do you know that as a fact?—Yes.

3423. Do you know what the fall of the river is between the weirs; they are about a mile apart, are they not?—No, they are not a mile apart; the distance is not much more than a mile from Iffley to Oxford.

3424. Looking at the map it appears to be more?

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Mr.

Admiral Egerton—continued.

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more?—It is just the length of the boat-race, you know. The boats start just opposite the second meadow from the weir.

Mr. Samuelson.

3425. Is the river embanked at that point?—I do not quite understand what you mean.

3426. Can you make a little sketch of the cross-section of the river there?—No, I could not do that.

3427. Is there a bank like that (*showing a sketch to the Witness*)?—Yes.

3428. And both the level of the water and your meadow are below that bank?—Yes, there is a bank like that.

3429. Will you have the kindness to state what is the inscription on the high-water mark?—“H. W.” and a broad arrow.

3430. Is there any date upon it?—None. I could not see any date; at least I saw nothing but “H. W.”

3431. Will you describe the balk which you say has been put on the top of the weir?—Yellow deal, 4½ by 9, I should think.

3432. Is it in one length, or several lengths?—It is in two lengths in one weir, and in one length in another weir.

3433. What would be the shortest length of any one of those balks?—Twelve or fourteen feet, I should think.

3434. Then, would it be possible for the man in charge of the weir to place a balk of that size in position without assistance?—Yes; one man could do it, but two men would do it better.

3435. How is it secured?—There are two posts down in that way (*describing it*), and these pieces of wood are blocked in between them in grooves.

3436. Of what material is the sill composed on which those balks are placed?—Stone.

3437. The sill then is permanent?—The sill is permanent.

3438. Do you know when the repairs to the Iffley Weir were carried out?—I have never known any repairs done to it. I do not know that.

3439. Were there any balks in this place at all before these which you say are now placed there; or was this an addition to the weir?—It is an addition to the weir.

3440. Is it a new addition?—Yes, within the last few years.

3441. You have never seen it until within the last few years?—I never saw it until 1870. It was not till then that I paid particular attention. I have seen the water running over without any balks at all.

3442. How did you know that there were no balks; did you notice the sill of the weir?—I have seen it this year without balks, when there was plenty of water in the river.

3443. Did you ever see it for many months at a time without balks?—I cannot say for many months at a time, but I have seen it this year without balks, and I have seen them outside on the land.

3444. You have described that the balks are placed between uprights?—Yes.

3445. Do you know when those uprights were placed there?—I cannot tell you that.

3446. Do you remember any time when they were not there?—No, I cannot say that I do; I cannot say one way or the other. I never no-

Mr. Samuelson—continued.

ticed them until I became interested in it, then I began to take more notice.

3447. Then you did not examine this weir minutely until you found that your meadow was flooded?—When I found that my meadow was flooded at high-water mark, I began to look and see what was the matter.

3448. Really you had no positive knowledge of the condition of that weir until you were inconvenienced by the floods?—I had seen the weir.

3449. But you did not notice its construction until you were inconvenienced by the floods?—No, I know there were no balks there.

3450. I thought you said that you had seen the balks at different times removed and replaced for many years?—No, not for many years. This year I have seen them removed; I have seen that within six months.

3451. But had you taken sufficient notice of the weir before the time when your meadow was flooded, to be certain that there were no balks?—No, I had paid no particular attention to it, until I found that the water came in upon us.

Mr. W. H. Gladstone.

3452. What do you suggest as the reason for raising the high-water mark, if it was raised?—To open the river for navigation. The river has naturally become filled with Oxford sewage, and the filth of many years and generations; and now, instead of taking out that stuff, and so clearing the way, they have from time to time raised the water, otherwise the boats could not go up and down at all.

3453. Were there any complaints of insufficiency of water before they did that?—I know that boats have stuck there; in fact, boats have stuck within the last month.

3454. In what part of the river?—Between Oxford and Iffley. The next witness will tell you the time when he saw two boats stuck there.

3455. Has it been ascertained that the river has silted up in that place?—I have no doubt of it. You can put a punt-pole down in six feet of black ooze; anybody can see it for himself.

3456. Is that an evil which arose particularly during the last few years, in which you say that the water-mark has been raised?—It has been gradually growing more and more. As the population increased, I suppose, more filth came from Oxford, and now they cannot pass a large boat up or down the river without raising the water very considerably.

Mr. Hall.

3457. I suppose the effect of raising this water-mark is something of this sort: under the old system, when the water-mark was at its original level, when you found your meadows flooded, you went to the miller and said, “Let off the water;” but now if you go to the miller, or rather to Reeve, and ask him to let the water off, he points to the water-mark, and says, “It is not yet up to high-water mark, so I cannot do it?” That is exactly it. Formerly, when it was up even above high-water mark it was not in the meadows, but now since the water-mark has been raised whenever they put it up to high-water mark it is in the meadows.

3458. The sill of the lasher regulates exactly the height of the water in the river?—Yes.

3459. And

Mr. Hall—continued.

3459. And if the river gets filled up with mud, they put another balk on the sill of the lasher; that is what you say?—Yes.

3460. Is the damage which you complain of to your meadows, confined to flood-time, or do you complain of damage in the summer months?—I do not complain of damage at flood-time at all; I complain of damage now in the summer months.

3461. Because the river is raised abnormally?—Yes, because the river is raised abnormally.

3462. Then when you say that your meadow is below the high-water mark, you mean, I suppose, that it is below the level of the water raised by this artificial high-water mark?—Yes.

3463. If it were not for this artificial high-water mark, your meadow in its normal condition would be a foot above the river; that is what you mean?—Yes; we never were flooded until the high-water mark was changed. The Conservancy say in their letter, that it was a fixture. I am prepared to prove that it has been taken from one side of the river to the other, and that it was not a fixture before that.

3464. I think you stated that this moveable high-water mark which was taken to the other side of the river was, when so taken, raised higher than it had been before when it was stuck in the mud as a moveable water-mark, is that so?—It is so; it is much higher now than it used to be, but I complained of the height of it when it was on this board. They said that it had never been moved since 1866; I say that it was not a fixture at all, that it was moveable in the mud; I have moved it up and down myself.

3465. What I want to know is this, after the one which was stuck in the mud was taken away, was the new one which was put in its place, the fixture made higher than the old one or not?—The old one was not fixed, so I cannot tell you how that would be; it was moveable at pleasure.

3466. You can tell this, that the water after the moving of this high-water mark, became higher in your meadows than it had been before the moving?—Yes, it has been worse year by year; this year it is worse than it was last.

3467. I think you said that the balks were sometimes taken off?—Yes.

3468. Have you seen the balks lying on the bank then?—Yes.

3469. And the lasher without them?—Yes.

3470. That would be when there is a good deal of water in the river?—Yes.

3471. At flood-time?—Yes.

3472. Supposing those balks of which you complain are off, and the weather is ordinary weather, would the river be about the height that it used to be at, that is to say, about the old high-water mark?—Yes, it would.

3473. Then this water which is required for navigation, is taken, in fact, at the cost of your meadows?—There is no room for the boats down below, so they raise the water above.

3474. Can you tell the Committee what damage you think you have sustained in the summer?—In 1874 they entirely spoiled my crop of hay.

3475. That was without any flood?—Yes. I am only speaking for myself, and my neighbours have suffered more. The first year that I rented that ground I paid 6*l.* an acre for it; it is not worth 30*s.* now, or not much more, certainly.

O.114.

Mr. Hall—continued.

3476. You do not ascribe that to action of winter floods?—Not at all; a winter flood does it good. I am able to mow it twice, and get three or pretty well three and a-half tons of hay from it in the year.

3477. Is there any part of your meadow under water now?—If the water is up to high-water mark, part of my meadow is under water. When over they raise it up to high-water mark it puts part of my meadow under water; it was so last Friday, Saturday, and Sunday, and, I believe, on Monday too, but I was not there then.

3478. When they raise it up to high-water mark, and put your meadow under water, you have no redress, because they say it is not above high-water mark?—Just so. I called the lockman's attention to the fact that the water was four inches below high-water mark, and still the water was in my meadow, and if he had raised it up the four inches it would have been a pond.

3479. Your contention is that the high-water mark has been shifted, and that it is now placed at least a foot higher than it ought to be?—At least 14 inches higher than it used to be.

Mr. Praed.

3480. Do you think that the water was raised at the instigation of the miller?—The miller had nothing to do with it; it was the Thames Conservancy.

3481. You do not think it was raised to enable him to get more water for his mill?—It was raised for the navigation, I said. It is raised on what they call the "flush days;" that is Mondays and Fridays, for the big boats to come by. We are always flooded on those days.

3482. On Mondays and Fridays?—I am not sure whether it is on Mondays, or Tuesdays and Fridays.

Chairman.

3483. You state that the miller has nothing to do with it?—I believe not; the lockman regulates it.

3484. But I think you stated that Reeve, the lockman, acknowledged to you that he had done this work of putting up the balk, and that he would not take it away because the miller would not let him?—Yes, that is what he told me.

3485. That he would get the sack if he was to tell you who had given him orders to do it?—He said, "Do not get me into trouble, or I shall get the sack."

3486. I have read to you a passage from Mr. Leach's evidence; I will now read a passage from Sir Frederick Nicholson's, the chairman of the Thames Conservancy: "It has been suggested by a great many witnesses, and I believe there is a gentleman going to be examined to-day, who also thinks that we have raised the sills of the weirs. I have asked Mr. Leach about that several times, and so far as I know, and so far as he knows, we have never raised any sill of any weir whatever;" do you now think that it is done by Reeve, the lockman, owing to instructions he has received from the Thames Conservancy?—I have no doubt of it whatever.

3487. As regards these balks, are you aware of any fishery rights in the neighbourhood of Ilfley?—Down below the weir.

3488. Who has fishery rights there?—I think it is a company; people pay so much a year, and belong to the company.

3489. Have they any control over the balks?—I should

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*Chairman*—continued.

—I should think not. I do not know of my own knowledge.

3490. You are quite convinced that the Iffley weir has been raised at least 14 inches, and that it has been done for the sake of the navigation, and by the orders of the Thames Conservancy?—Yes, I am positive of it.

*Sir Trevor Lawrence.*

3491. Have you on the edge of your meadow, and between your meadow and the river, any-think in the nature of an embankment?—Yes.

3492. Is it possible or is it not possible that that bank may have gradually worn away, so that instead of the water being higher the bank is lower now?—No, that is not so, because I put that bank there within the last few years, and the water could not get over that bank even now, unless a boat comes down, but it goes round through another man's meadow, and so gets into mine; it comes round through White's. The water does not come over the bank unless a boat comes along, and that will send it over my bank.

3493. If your bank is still perfect your neighbour's bank may be defective, and if there was a break in his bank the water would be let in notwithstanding yours being perfect?—I do not think there is any break at all, because I put mine up not long ago; when I cleaned out a ditch I put the stuff there to keep the water out.

3494. You say that the water does not come direct from the river into your meadow, but it comes through your neighbour's land?—Yes, except when a boat comes along, and then when they have it at high-water mark it will send it right over my bank.

3495. Is this lasher to which you have referred in good repair or not?—I should say it is in good repair.

3496. It is not a tumbledown thing that has occasionally a plank more or less in it at different times?—No, it is in good repair, but it has occasionally a plank more or less.

3497. But it is not a tumbledown thing into which a board is stuck to fill up a gap, or anything of that kind?—No.

*Mr. Cartwright.*

3498. When you made that bank originally, did it protect your meadow against being swamped when a boat came down?—It did, partially, but a boat would always shove the water over it.

3499. Was it a greater protection when it was first put up against the effects of a steamer or a boat or whatever may come down than it is now?—Yes, because year by year they have been raising this water-mark.

3500. As a fact, can you say that at the present moment it is not the same protection to you against the effects of a boat coming down as it was when it was first put up?—It is not.

3501. With regard to an interview with the Conservators, you never have had any interview at all with the Conservators, although, I believe, your correspondence began in 1875?—Yes.

3502. If they had been down twice a year since 1875, although they knew there was a cause of grievance or a cause of complaint on your part, they never paid any attention to it?—They wrote me a civil letter.

3503. But at no time have you had any inter-

*Mr. Cartwright*—continued.

view with those who are the official representatives of the Thames Conservancy?—None whatever.

3504. And you cannot call to mind their having paid any official visit to Oxford, or their having been in personal communication with you or your neighbours?—No, I have never heard of them, and none of my neighbours ever heard of them as having been there, so far as I know.

*Admiral Egerton.*

3505. As to the termination of your embankment, I think you say that now the water comes round the end of your embankment from your neighbour's ground on to your field?—Yes.

3506. The top of your embankment then is above the high-water mark where it is now placed?—I should think so; my bank is certainly above high-water mark; it would even be above it where it is now placed.

3507. The level of the meadow itself being of course below?—I should say the level of the water had been raised 18 inches; we all agree that it has been raised 14 inches for certain.

*Mr. Samuelson.*

3508. Why did you place that bank there?—I went to the expense of clearing out a brook, and had got to put the rubbish somewhere, so I put it up against the river to keep the water out.

3509. Did you think that it was possible to keep the water out if the meadow of your neighbour adjoining yours was not embanked?—It did partially; in small floods it would do so; the high-water would go off nine inches.

3510. Was your meadow flooded previously to your placing the bank there?—In winter always.

3511. Not in summer?—Sometimes in summer, when there was a flood.

3512. Not unless there was a flood?—Not unless there was a flood.

3513. You have never seen it flooded unless there was a flood?—Never up to the time that I put the bank there; we could always turn horses into it, or mow it twice a year.

3514. What is the height of the bank?—I should say about a foot.

3515. What is it composed of?—Clay, mud, and stakes; the stakes are put in to keep it together; they are willows, and so forth.

3516. There was no particular pains taken in constructing that bank?—It cost a good deal of money.

3517. Do you remember what it cost?—I think it cost me about 6*l*.

3518. What is the length of it?—The whole length of the meadow that faces the river is, I suppose, 150 or 200 yards; it is a narrow and long meadow.

3519. Then the bank cost about 8*d*. a running yard?—I did not do it by measurement; I did it by day-work.

3520. It cost you 6*l*. for about 150 yards?—That was for taking the stuff out of the ditch and putting it there.

3521. It was not puddled, I suppose?—It was rammed down together.

3522. It consisted of clay and rubbish?—Yes.

3523. Was that of sufficient value to have been of any use as manure?—These meadows do not require

Mr. Samuelson—continued.

require manure; they are always subject to the winter floods.

3524. Have you any other land that would have been benefited by it if used as manure?—The upland would have been benefited by it no doubt.

3525. But you did not think it worth the expense of carrying it there?—No, I had not got any other land to carry it to.

3526. At that time?—No.

3527. Was it principally clay?—Principally clay.

3528. Stiff clay?—Yes, stiff.

3529. What sort of stakes are those by which it is held together?—Willow stakes; some of them grew and others did not grow.

3530. Some of them were growing on the bank before?—No, they are growing now. Willow

Mr. Samuelson—continued.

stakes, if you stick them in, will grow in such a place as that.

3531. They were not growing there at the time; they were willow stakes specially put in?—Yes.

3532. Do you remember the size of them?—About the thickness of my arm.

3533. Who superintended the putting up of this bank?—I employed three or four men in the village.

3534. Were they men who had had any practical experience in the construction of banks?—The man who principally did the work is an Iffley man.

3535. But is he a man who had been accustomed to construct water-tight banks?—No, I cannot say that he is; he is only a neighbour.

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Mr. THOMAS ALDEN, called in; and Examined.

Chairman.

3536. You rent land in the neighbourhood of Iffley weir?—Yes, it is nearer Oxford than Captain Owen's.

3537. How long have you lived there?—I have been there for 50 years, and my father was there before me.

3538. Have you known of your own experience of any alteration being made in the weir or lasher of late years?—I know that formerly when some of my land was at all under water we went down to Iffley weir, and found that it was above the water-mark, and then we got them to lower the gates, but I now find that they tell us it is not above the mark, and so they cannot lower the gates, and still the water remains on the land.

3539. Who has altered the height of the water?—I do not know; I only know that the water-mark is altered; I know it is moved.

3540. Do you know by whose orders that was done?—No, I do not know that of my own personal knowledge; I have heard it.

3541. Have the Fishery Company had anything to do with it?—I think not.

3542. Has the miller had anything to do with it?—The miller used to have to do with it, but now it is taken out of his hands.

3543. Has the Thames Conservancy had anything to do with it?—Yes.

3544. You think they have raised the sill of the weir?—Yes, I think so, because the water now is on the land when it is not above the mark.

3545. What height have they raised it?—A foot or more.

Sir Charles Russell.

3546. How many years ago can you recollect, of your own personal knowledge, the state of the river with regard to the land?—More than 50 years. It was always my business when I was a lad to go and have the gates drawn when it was necessary. My father told me, "When the water is on that land you see it is above the mark; then go down and get the gates open," and I find it so, but now that is not the case.

Mr. Cartwright.

3547. Did you not say that the sills had been raised?—The lasher is a permanent stonework with a sill on it.

O.114.

Mr. Cartwright—continued.

3548. Have those sills always been there?—Not the balks.

3549. When did you first see those balks?—I do not pass by very often; I do not live so far down as Captain Owen.

3550. However, when did you first see the balks?—I cannot say exactly; two or three years ago, perhaps.

3551. Can you say that there were no balks there before?—I have seen it without balks several times.

3552. When?—I cannot say when.

3553. Do you mean since that time or before?—Before. I remember some years ago a balk being put down there by the miller, and a Mr. Wyatt and some other landowners there went and made him take it off, and he did.

3554. When was that?—That might be 25 years ago.

Mr. Samuelson.

3555. Do you know how these balks are secured in their places?—I have not examined them, but it is a piece of deal, a plank I think, held by a stake driven in to keep it from coming down; it is not a very good fixture.

3556. You spoke of a water-mark; do you know what is written upon that mark?—I have not seen it lately, but formerly there used to be "High" on the old water-mark when it was on the other side of the river.

3557. And anything besides?—Nothing, that I have noticed.

3558. Have you seen the mark that is there now?—No, I have not; I have only heard that it is on the other side of the river.

3559. Did you ever see the old mark in two different places?—No, I do not recollect myself seeing it anywhere but in the one old place.

3560. Always in the same place?—I have generally sent my servant down to see whether the water is above the mark, and he has brought the message back that it is not above the mark, and so they would not open the gates.

3561. You do not know whether the mark was placed sometimes higher and sometimes lower?—I do not know that of my own knowledge; I know it only by what I have heard.

Mr. Hall.

3562. Have you got a private mark on either of

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Mr. Hall—continued.

of your meadows?—There is a piece of flat land just going into my house; when the water is on that, it used to be always above the mark, now it is not so.

3563. Is the water on that piece of land at the present moment?—It was on Monday last; it was over it.

3564. And on Sunday?—I do not recollect about Sunday, but I think it was on Sunday too.

3565. Is it more often now upon that piece of land than it used to be 10 years ago?—Yes, certainly.

3566. Much oftener?—Yes.

3567. Ten years ago, when you saw water upon that bit of land, what did you do; did you walk down to the miller and ask him to let down the water?—I always walked down or sent down to him, and he immediately drew the gates and the water went off.

3568. Now when you find the water upon that same piece of land have you any redress at all?—No, I have sent down and gone down myself once or twice, but he says, "Look, it is not above the mark, and I dare not draw the gates until it is above the mark."

3569. In olden times when you went down to complain of the water being on this piece of land, did you ever know a single time when the water was below the high-water mark, or was the miller always able to give you relief?—Yes, he was always able to give me relief except in a very high flood.

Mr. Hall—continued.

3570. I mean at times of ordinary high-water?—Yes.

3571. Was there another water-mark upon the Berkshire side?—Yes, there was another water-mark on the Berkshire side formerly.

3572. How long ago?—I do not know exactly, six or seven years ago, I should think; I have seen it there.

3573. Have you ever had any difficulty, in consequence of the miller refusing to draw and give you relief?—Yes, once Mr. Castle and I informed against the miller to the Oxford magistrates, but we let him off.

3574. Did you let him off or did the magistrates let him off?—We compromised the case; he promised not to do it any more, and we did not think it necessary to enforce the fines.

3575. He promised you not to do it again?—Yes.

3576. Is it in summer principally that this damage is done to you?—Yes.

3577. You do not complain of damage at flood-time?—No; only in spring and summer.

3578. When the water in the river is in its ordinary condition?—Yes.

3579. What damage has it done to your land?—Very considerable in some parts; it is not on the whole of the meadow, but it is on parts of the meadow; it makes it grow sedgy.

3580. Do you consider that you are a loser?—Yes, I have been a considerable loser by it.

Mr. WILLIAM LUDLOW, called in; and Examined.

Mr.  
W. Ludlow.

Chairman.

3581. You are an occupier of land at Iffley?—Yes.

3582. To what extent?—I have got a meadow of between 30 and 40 acres there.

3583. Have you noticed any alteration in the height of the lasher at Iffley?—Yes.

3584. How much has it been raised?—They have tapped a piece of board on the top of the board that was there before.

3585. Who has done it?—I do not know, but it must be by the orders of the Thames Conservancy.

3586. By their authority?—By their men.

3587. That has flooded your meadow?—Yes.

Mr. Hall.

3588. When the water was up to the old high-water mark that you remember some years ago, your meadows used to lie perfectly dry, did they not?—Yes, quite dry. I have had a flock of sheep then penned and hurdled on the meadows.

3589. Do you remember when you began to notice an alteration?—About four or five years ago; about the time they shifted and raised this high-water mark.

3590. Can you give us any definite reason for supposing that this high-water mark was shifted?—We have not a doubt about it; we have no reason to doubt it; the land speaks for itself.

3591. You judge entirely by the land?—Yes.

3592. Has there been any alteration in the banks of the river?—Not a bit, the banks are quite as good as they were formerly.

Mr. Hall—continued.

3593. With regard to the bed of the river, what sort of condition is that in; is it as good as it was?—It is in a very bad condition; it is not trafficable in many parts.

3594. Could a laden boat go up it now?—About a fortnight ago two were stuck there opposite to my meadow.

3595. Do you think a laden boat could now get up if the water was up to the old high-water mark?—Yes, if it was up to the old high-water mark it could.

3596. Then a boat could float?—It could then, but with difficulty; you see the river is thoroughly blocked up with mud. There is a place by my meadow now where you might push a pole down eight or nine feet in solid black mud. There the boats get stopped, and the consequence is they must get high-water up above in order to drive the boats through and get them by.

3597. Have you known any boats stuck there lately?—Yes; it happened about a fortnight ago, in the evening.

3598. Your opinion is that they put up this water on purpose to float the boats?—Yes, they cannot float them without in many parts.

3599. What damage have you suffered by it?—A good deal of damage; it is our hay that suffers; it is in the summer, and not in the winter, that we complain of it.

3600. Without any extraordinary flood do you get damage done to you?—Yes, without any flood at all.

3601. Have you ever seen these balks?—Yes. They

Mr. Hall—continued.

They all got blown away last winter, I mean driven away by the force of the water; now they have put some new ones in the same place. It is a piece of board about as wide as this (*describing*

Mr. Hall—continued.

it) dropped in between two piles, and they wind it up with a chain in the same way as you would wind water up out of a well, or something similar to that.

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Mr. JOHN H. TAUNTON, called in; and Examined.

Chairman.

3602. ARE you the manager of the Thames and Severn Canal?—I am the engineer and manager.

3603. How long have you filled that position?—Twenty-five years.

3604. What is the state of the canal now?—It is in working condition. We carry about 50,000 tons annually over the canal.

3605. What sized craft can go along your canal?—The canal is made for Thames barges; the same barges that can pass down the Thames can pass over the canal.

3606. Can larger barges pass along the canal?—Severn barges pass to Brinscombe Port, the locks to that point being 16 feet wide; beyond that point barges with 11 to 12 feet beam can pass.

3607. Are you acquainted with the state of the river from Lechlade to Oxford?—I am but too well.

3608. Have you lately visited it?—Yes, I have.

3609. Will you give the Committee an idea of the state in which you found the river?—It is not navigable; it is in a deplorable condition.

3610. For how far is it not navigable?—From Newbridge to Lechlade.

3611. A barge cannot get along there?—No canal-boat or loaded trading vessel can pass there. Would you like me to give you, shortly, the dates to which I refer when I speak of having tried the navigation of that part of the Thames?

3612. If you please?—In October 1876 I bought a steamboat in London for the purpose of carrying our traffic on the Thames and Severn Canal; I sent that steamboat up the Grand Junction Canal. It passed freely over the Grand Junction Canal, it passed down the Oxford Canal, and it entered the Thames at Duke's Lock, above Oxford, on October 19th. The man in charge of the steamer was an experienced man, and the steamer, though it was a time of full water, only drew 3 feet 6 inches, with which draught it had run freely over the canals I have mentioned. I have a detailed report here, with all of which probably you do not wish to be troubled, but I may perhaps quote to you some passages from it: "We got to Skinner's Weir that night" (that is, on the 19th of October), "but had great difficulty in getting round the last bend in the Thames below Skinner's Weir Pool. Started from below Skinner's Weir on Friday morning, October 20, at 6.30, and got on very well to Ridge's Weir, which we found open; sent to the weir-keeper to come and assist us, but he was not at home; got the assistance of a man who lives at the house at the weir. The gates at this weir are very imperfect; could not shut the water perfectly. Proceeded very well to Newbridge, where we took in some coal for steamboat; got through Newbridge, but was stopped just above the bridge by a bad hill of gravel and flum of rushes; got over this without much difficulty, and went on to 0.114.

Chairman—continued.

Rose's Weir. The bottom of our steamboat just touched the sill, but we did not stop. We went on then very well until we got to Standlake Ford, where our first difficulty began, we could not steam over the ford. I went to a farmer near (Mr. Hammans), who charged me 15s. for the use of his three horses to haul the boat over Standlake. I paid him 12s. After getting over Standlake we got on with little difficulty to a little below Old Shifford, where we grounded on a bed of mud and gravel."

3613. Are you going to read the whole of that report?—I will try to cut it short.

3614. You met with great impediments, in fact, it was almost impossible to get up with your steamer?—Yes, our steamer was almost stopped there.

3615. Did you get your steamer through eventually?—Yes, after great expense, after a week's labour.

3616. And hauling it with horses?—Yes; and with a broken stern-post, and so on.

3617. Do you consider that this deplorable and neglected state of the upper part of the River Thames adds to the floods in the Valley of the Thames?—I believe it to be mainly the cause of the floods.

3618. And that if the Thames were cleared out, and considerable dredging-works carried out, the floods would be much diminished?—Not considerable dredging-works. I think a very moderate amount of dredging. I may say a very small amount of attention to the conservancy of the river would have prevented the floods which have arisen since the present Conservators have had control of it.

3619. Then you consider that the upholding of the navigation would tend to diminish the floods in the Valley of the Thames?—I do.

3620. The same works would answer both objects?—Yes. You have put a question to me with respect to the state of the river, and with respect to the neglected condition of the river having caused the floods; now, with reference to that question, I do not think I should quite do justice to myself, and to the information which I wish to convey to you and the Committee, without stating that the opinion which I have expressed to you rests upon a very careful inquiry, and upon facts which I have made myself fully acquainted with. I have made calculations of what should be the sectional area of the river to carry off floods at Lechlade and the various points below. I have ascertained, from gaugings which I have taken continuously of the Thames, that the probable maximum flow of the river at flood-time at Lechlade is 28 times its low summer flow, or about 576,000,000 gallons per diem. To carry that off with a fall of two feet per mile, which is about the flood-fall, would involve a section only 70 feet wide at the surface-level, and 50 feet wide at the bottom-level, with a mean velocity

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Taunton.



Mr. J. H.  
Taunton.

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Chairman—continued.

velocity of 205 feet per minute; that would accommodate that flood.

3621. What depth?—Five feet deep. I have the calculation here, and I will hand these sections to you (*handing in the same*).

3622. You are aware that the Thames Conservators allege that they would gladly do these works, but they have not sufficient funds to carry them out; have you any remark to make upon that subject?—I think that the Thames Conservators waste their funds very largely. My experience has extended over the management of a canal which is in difficulties during a long period. We have certainly made great efforts to reduce expenditure in every possible way. I have 43 large locks to maintain; if you would like to see the sections, I can show them to you. They are deeper locks than those on the Thames considerably, averaging from eight to nine feet. I have a pumping establishment to maintain, and I have 30 miles of difficult canal to maintain, going over as bad a summit as any in England. That is maintained for 2,500*l.* a year. The locks on the River Thames (I speak subject to correction, for I have taken them from the "Oarsman's Guide," which is a very good chart, I believe) are, I think, 33 between Lechlade and Staines; they have very small falls, they have no water to pay for, and their revenue is about 10,000*l.* a year. I think, with better management, that the river, with the funds at its disposal, might be kept in a very much better condition than it is.

3623. You say you could keep 40 locks in repair for 2,500*l.* a year; do you think, if you had the management of the navigation above Oxford, you could keep it in good order for 5,000*l.* a year?—I would hardly say that I could, but I think it might be done, undoubtedly, from Oxford to Lechlade, for a very much smaller sum than that. The amount of traffic, which has been systematically neglected, and has been very small indeed, would then be increased. I have taken the average expenditure of the Conservators since 1866, since they have had charge of the river, and I find that, irrespective of the 700*l.* a year paid to the Upper Conservators, they had for the superintendent, and his travelling expenses, 389*l.* 1*s.* 10*d.* I should explain that I have not got the accounts for 1870 or 1876. I have not omitted them from any reason, but I simply could not get them. I have taken the sums included in the published accounts for 1867, 1868, 1869, 1871, 1872, 1873, 1874, and 1875, and I find that the superintendent and his travelling expenses came to 389*l.* 1*s.* 10*d.*; further travelling expenses, 137*l.* 19*s.* 8*d.* Then there is a charge for a steam-tug, which I do not think serves the purpose of a steam-tug, at least I do not know that there is any traffic on that part of the river to which that refers. What we complain of is that we cannot put any traffic there. The steam-tug is an expensive item, 399*l.* 15*s.* 10*d.* per annum; stationery, 89*l.* 16*s.* 7*d.*; and sundries, 75*l.* 12*s.* 11*d.*

3624. You are of opinion that it is not so much due to the want of funds as to bad management that the Upper River is not in that state which could be desired for the purpose of navigation?—Undoubtedly; and I may perhaps be allowed to supplement my answer with reference to what the increase of the funds would be if this missing link in the chain were made good;

Chairman—continued.

if they made good the Thames from Lechlade to Oxford, and you would connect the London with the Gloucester traffic. The Gloucester people are deeply interested about the maintenance of a through water-communication from Gloucester to London, and if there was a perfect navigation between these points, they would have a through communication which, I believe, would very greatly increase the revenue. I have a return of the traffic over the canal in former years, if the Committee would wish to see it.

Mr. Walter.

3625. How long is it since the upper part of the Thames has ceased to be navigable, and to afford facilities for the navigation to the extent which the canal would carry through to the Severn?—I think about 1866 we could get a loaded boat down to Newbridge.

3626. Newbridge is the point at which it ceases to be navigable now, is it?—No, Lechlade is the point at which it ceases to be navigable.

3627. Is Newbridge above or below Lechlade?—Newbridge is nearer Oxford.

3628. You think it very desirable that the communication should be restored to its original capacity?—On every ground I think it is desirable; and I think, too, on the ground of providing funds for the Conservators to maintain the river efficiently, and on the ground of commerce also.

3629. What sized barges and what tonnage should the river be made able to accommodate?—We used to carry 70 tons in one barge to Oxford from Lechlade.

3630. What depth of water would that require?—About 3 feet 6 inches. That was the old Thames barge of from 80 to 90 feet long, and a little less than 12 feet beam.

3631. What sized boat, or barge, could pass through now from Oxford to the Severn?—No loaded boat can pass up the Thames above Newbridge now.

3632. When you speak of a loaded barge, what tonnage do you mean?—I mean that a boat drawing over two feet of water cannot pass. On the 23rd of June I was on the Thames with Mr. Marling, the honourable Member for Stroud. There is a committee, I should tell you, consisting of a great number of merchants at Gloucester, nearly all our magistrates, and a great number of our members, for the purpose of maintaining the navigation of the river, if possible, from Lechlade. Mr. Marling was anxious to satisfy himself of the state of the river, and he went with me on the 23rd of last month. At the tail of St. John's Lock, at Lechlade (about which we appealed, in February or March last, to the Thames Conservators to remove a little gravel bank, which might have been done at an expense of 5*l.*) we found only one foot of water for our boat to pass over, and we were in a row-boat. When we got to Sandford, we found a large shoal below the junction of the stream which runs into the river there. Just above that point we saw some cart-colts looking for a crossing, and they showed us exactly where the shoal was that we were in search of, for they all walked across, wetting their legs up to 18 inches. They passed just in front of our boat. That was the state of the river on the 23rd of June last.

3633. Where does the Severn Canal enter the Thames?—At Lechlade.

3634. Did

Mr. *Walter*—continued.

3634. Did I understand you rightly to say that, so lately as 1866, the navigation was sufficiently open to admit of barges of 70 tons going through?—My answer was that, I think in 1866, some boats passed. I can give you the traffic for the previous year, if you wish it.

3635. How long ago is it since barges of 70 tons could pass through from Gloucester to London?—Not within my experience; not within 25 years. Within 25 years a barge of 40 tons has passed.

Mr. *Samuelson*.

3636. How long is it since you remember one of 40 tons passing?—I have given that in evidence before the Commissioners on Pollution of Rivers, but do not at this moment remember the date.

3637. Was it before or since the control passed into the hands of the Conservators?—Before.

3638. Do you know how long before?—I should think it would be about 1863, approximately.

3639. What would the draught be of a boat of 40 tons?—She would pass with a draught of three feet.

3640. Since 1863, so far as you can remember, a boat drawing three feet has not been able to pass?—It has been gradually getting worse.

3641. The navigation was being deteriorated before the powers were assumed by the Conservancy Board?—No doubt. Those powers were given in consequence of that deterioration, and it is recited in the Act that, if powers were granted, a large increase in the tolls might be obtained by re-opening the navigation.

3642. You spoke of boats of from 80 feet to 90 feet long passing down the Thames; would those boats be able to pass through all the locks?—They have done so.

3643. What is the length of your smallest lock?—Our locks were the same length as the Thames locks; a little over 100 feet.

3644. What are they now?—We have altered them to 72 feet, or 73 feet.

3645. Is there no lock on your canal shorter than 72 feet?—No, none.

3646. I think you have said that those boats, drawing 3 feet 6 inches, could pass over every portion of your canal?—Not throughout the dry season; not always.

3647. What is the minimum during the dry season?—We endeavour to keep three feet of water in the summit of the canal, but we do not always succeed in doing that; and when we do not succeed in doing that, we are obliged to carry on the traffic, under great difficulties, by lightening the load of two boats into a third, and so carrying the traffic in an additional boat, which is a costly operation, over the high-level ponds, when there is a deficiency of water.

3648. To how little are you obliged to lighten your boats in order to be able to carry on your traffic under these circumstances?—I have known canal boats lightened very much. We reckon that it does not at all pay if they are lightened to less than 20 tons.

3649. Whether it pays or not, to what point are you obliged to lighten your boats in the summer, so as to be able to carry on the traffic?—I lightened them last year, reducing the total weight to 16 tons.

3650. What draught does that leave?—About 2 feet 3 inches.

3651. Is that over any large portion of the

Mr. *Samuelson*—continued.

canal?—It is; it is over about eight miles.

3652. With respect to the expense of keeping up the works of the canal, have you any dredging done?—Yes, I have hand dredging; I have no steam dredging.

3653. What does your dredging come to per annum?—I keep no separate account.

3654. Can you make an estimate of it?—I cannot. The expense with repairs, as distinguished from lock-keepers, is about 700*l.* a year. They do the dredging, but they do many other things besides the dredging. We also let the pounds out in case any occasion requires it, which we have the means of doing, and we remove the mud with a spade and shovel.

3655. Have you any important repairs in addition to what is required for the maintenance of the locks?—Yes. I have a tunnel nearly two miles and a half in length to keep in repair.

3656. Through what strata does the tunnel pass?—Through the oolitic strata throughout; the inferior oolite, the fuller's earth; the great oolite overlying the fuller's earth. It is bricked for more than half this distance through the fuller's earth.

3657. Would this expense arise in portions that are bricked, or in portions which are not bricked?—In the portions which are bricked.

3658. I suppose the bricks are loosened by the percolation of the water?—Yes, and old age.

3659. Have you any weirs to keep in order?—At every pound we have a waste weir.

3660. There is no comparison, I suppose, between the size of your weirs and those on the Thames?—No.

3661. In fact, it would be difficult to institute any comparison between the expenditure on the Thames and on your canal?—Not so, because the cost of the maintenance of the locks would be very similar. The cost of dredging, when done by steam-power, would be similar, and the general system of supervision would not be very far different.

3662. But I presume the fact is that your dredging is very trifling compared with that on the Thames?—It is.

3663. And that your weirs are of very little moment as compared with those on the Thames?—The weirs are not, a very great source of expense on the Thames, I think, for they have removed a great number of them. They take credit for the removal of a vast number in the upper Thames.

3664. You are not aware that it has been stated in evidence that the weirs have been a source of very great expense?—Probably they have, but I only state that in this printed Return, which was made by the Conservators in February of this year, which gives a statement of old weirs removed in the district westward of Oxford, they say that they have removed eight weirs, and I say that in that way they have lowered the level of the water to such an extent that with the obstructions, created from want of dredging, they have left it unnavigable. It is in consequence of that that it is in this unnavigable condition.

3665. Supposing the Thames navigation restored to its original capacity, that is to a draught of water of 3 feet 6 inches, what would be the cost of the alterations which would be necessary in your canal in order to accommodate the Thames traffic?—I will answer that question if

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Mr. *J. H. Taunton*.

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Mr. Samuelson—continued.

the Committee wish it, but I think if a professional man gives the answer he ought to give it on careful consideration, and in this case it would be merely a guess on my part.

3666. Would it be 5,000*l.* or 50,000*l.*?—*£*. 5,000 would be about the sum.

3667. You think that 5,000*l.* would enable you to pass barges drawing 3 feet 6 inches of water from one end of your canal to the other?—I think so. I have no hesitation in saying I think so. I was aiming at rather a higher draught than that when I said 5,000*l.* Ostensibly we have three feet, although sometimes for short intervals it falls below that, but I think we should get four feet if we spent 5,000*l.* We think we should get by that means a through water communication from Gloucester, from the Severn to the metropolis, and not only that, but we should get a connection with the canal system which we now want. We cannot get to the Oxford Canal because of this block in the Thames, and we cannot get to the Grand Junction Canal because of this block in the Thames; I know it is a fact because I have been applied to very frequent lately that we should send a great quantity of timber to the Oxford Canal at Banbury. I have been applied to by timber merchants to carry timber to Bantury, and I cannot undertake the freight, because I cannot get over the Thames.

3668. What are the dues on the canal?—The dues vary to some extent with the articles carried.

3669. Say coal and timber?—I think it is about 2*s.* or between 1*s.* 6*d.* and 2*s.* for passing over the 30 miles, which is the entire length of the canal.

3670. I think you said that you carry 50,000 tons per annum?—Approximately.

3671. Is the greater part of that carried between any two given points?—It is.

3672. What are those two points?—The Stroud Valley; the service of coal to the mills in the Stroud Valley is our main traffic, and that traffic enables us to keep open, or has enabled us to keep open, the east part of the canal.

3673. How many miles is that?—About four miles.

3674. What are the dues for those four miles?—They vary from sixpence to a shilling.

3675. What portion of the 50,000 tons are carried above the Stroud Valley?—I am afraid I cannot answer that with exactness.

3676. Is it 5,000 tons?—More than that; but I cannot state specifically the number of tons.

3677. Do you carry traffic to Lechlade?—We do.

3678. Can you form any estimate of the amount of traffic per annum carried to Lechlade?—I cannot; it would be 4,000 or 5,000 tons, I should say.

3679. Is there any competition with the railway at Lechlade?—There is a keen competition.

3680. Between what points?—Between Lechlade and Gloucester. I might explain to the Committee that it is only two years since, under my advice, the canal company established boats of their own; we have now six boats, and we are carriers to Lechlade; we cannot get them below Lechlade, because of the block on the Thames, and if it were not for that block, I could make contracts with the Gloucester people for carrying it all the way down the river, and not only down the river but into the other canals.

Mr. Samuelson—continued.

3681. Do the dues which you mentioned consist simply of tolls, or do they constitute the entire payment for the hire of the boats, and every other charge?—I merely gave you the toll; the freight is another thing.

3682. What are the rates of freight for coal and timber?—I think between 6*s.* and 7*s.* between Gloucester and Lechlade.

3683. On that part of the canal, where you say your main traffic lies, what is the freight, say for coal, from Gloucester to Stroud?—I do not carry coal. The canal company, down to the last hour, wish to interfere as little as possible with the trader; we are only carrying that traffic which was lost.

3684. What trade is that?—The corn trade and the artificial manure trade.

3685. Between what points?—Between Lechlade and Gloucester.

3686. What is the freight?—Between 6*s.* and 7*s.*

Mr. Hall.

3687. I think you said that powers were given to the Thames Conservancy under the Act of 1866, because the river was getting year by year in a worse condition?—So it is recited.

3688. Since 1866 has it improved in any way?—It is worse, decidedly.

3689. Then the object of the Act has been defeated, so far as that goes?—In 1866 I represented some of the weir owners; and at St. John's Weir, for instance, I put a new good weir there at the cost of Mr. Prideaux, the weir owner, and it was in perfect condition; now it is in a state of dilapidation, it is not safe to go over it, it has been neglected, nothing whatever has been done to it; I tried to walk over it the other day, but found it to be dangerous, and could not do so; it is now falling down, and that is a weir which we have specifically called upon the Conservators to restore.

3690. Is that the St. John's Lock that you told us, where there was a bed of gravel?—It adjoins the lock; it is in the rear of that lock, near Lechlade.

3691. Then both St. John's Lock and St. John's Weir are out of order?—St. John's Lock is in very fair condition; St. John's Weir is in a state of dilapidation, but St. John's Lock is not usable, because at the tail of the lock is a shoal on which there is only a foot or 18 inches of water.

3692. And it wants clearing out?—It wants dredging.

3693. You did not tell us what answer the Thames Conservancy Board gave you when you applied to them to spend 5*l.*, I think you said, in doing away with this gravel shoal?—We had an interview with them. I have not got with me the correspondence which has passed with the Thames Conservators, but have had a long correspondence; and a deputation from Gloucestershire met the Thames Conservators, when their chairman suggested to the chairman of the committee appointed at Gloucester that he should put his requirements in writing, and that he did in a very mild sort of way so far as the requirements went. It was shown to me, and I thought that his requisitions were very moderate indeed. That was sent to the chairman of the Thames Conservators, and I have asked him, in this room, if he has acknowledged it, but I do not understand whether the letter was even acknowledged.

3694. No

Mr. Hall—continued.

3694. No answer was obtained, or at all events, nothing was done?—Nothing was done, on the contrary, this shoal that I specifically referred to is there still, and the Conservators were down at Lechlade on Whit-Monday.

3695. Then we may take it now, that since 1866, nothing but a pleasure boat is able to go from Lechlade to Oxford?—In a general way; there has been no regular dredging.

3696. Other witnesses have told us that the navigation is practically stopped; you have been giving some trade returns on this canal, but I think just now you were offering to the Committee some trade returns on the river previous to 1866, which you have got. Could you read it out for the last four or five years, from 1867 upwards?—I thought the Committee might wish to know what the trade formerly was; this return begins in 1804, and runs continuously on to 1812. Then, for the purpose of the recent inquiry, I had to take it out in detail for 1839, and I took that year, because it was just before there was any railway constructed in the district, and in a general way I found that 6,172 tons of goods and 6,015 tons of coal passed along the River Thames by Lechlade, and from there on into the Thames and Severn Canal in 1839.

3697. Can you give us for 1849?—I have not got that; my object was to ascertain what the traffic was before the railway system set in, and having regard to what might be expected now that trade has increased, we find everything has increased, although we have to compete, and I wanted to arrive at an estimate of what the trade on the river would probably be. Now, assuming the River Thames between Lechlade and Oxford to be put in a navigable condition, I think there would be between 20,000 or 30,000 tons of goods from which they would get a toll, and from which we would get a toll.

3698. Still the railways have taken away the greater part of the traffic; how would you meet that?—I do not admit that the railways, having reference to the long *detour* that they have got to make to Swindon and Didcot, and then back again into the district, can compete with us, and I am sure of this, that if the River Thames had a fair chance given to it, having reference to the facilities for navigation that it affords, and the low rate of fall per mile, and the facilities now for the use of steam tugs and trains of boats, and from having the stream with us, we should compete successfully with the railways; that is my idea; I am carrying on the contest now under most adverse circumstances, and we are doing it just on the principle to keep open the canal to the last hour that we can, and we find that under diligent management, we make the thing pay its way under competition rates.

3699. Do you know Godstowe Lock at all?—I know it, but I am not prepared to give evidence about it; I have been there, but I have not studied the thing sufficiently to occupy the time of the Committee.

3700. So far as you know, the works on that upper part are neglected, and it is to that that you attribute the loss of the navigation?—Undoubtedly.

3701. Can you tell the Committee if there is a strong public feeling against the management of the Board of Conservators in that part of the river with which you are acquainted?—There is a general feeling of dissatisfaction.

Mr. Charles Praed.

3702. You were speaking about the management of the Conservators, and you seem to think that their expenditure has been excessive; basing that opinion on your own calculations with reference to the canal, what is the greatest width of weir that you have on your canal?—I have no similar weirs to those on the Thames crossing the river; mine are merely overflow weirs alongside and parallel to the navigation, and not across the navigation, therefore they are not at all similar.

3703. Therefore it is simply a hypothesis on your part?—No, it is not exactly a hypothesis, because it is a subject which I have considered a good deal; the construction of weirs is a matter upon which I have been very much engaged on different occasions. The opinion that I express is a decided opinion, but it has no reference to my experience with regard to weirs on the Thames and Severn Canal.

3704. What is the expense of the weirs on the Thames and Severn Canal?—Very trifling indeed.

3705. What amount of water falls over those weirs?—It varies with the season; at short water time we allow very little water to be wasted; we allow none to fall over the weir if we can prevent it.

3706. Supposing there is a flood what do you do?—At flood-time we use the weirs for the carriage of the flood-water.

3707. Have you any idea what the capacity of those weirs during flood-time is?—Not at all, because it varies with different points of the canal; some pounds have a stream running through them very near the top; other pounds have not, and, therefore, there would be no uniformity in the volume of water passing over the waste weir.

Mr. Walter.

3708. What is your summit level above the sea?—Three hundred and sixty-three feet.

Chairman.

3709. Yours is a joint stock company, is it not?—It is.

3710. What was the value of the shares originally?—£.100.

3711. Have those shares changed hands lately?—A great number have.

3712. At what price?—From 3*l.* to 5*l.*

3713. Therefore it is not a very successful undertaking?—Oh! dear, no.

3714. Do you think that if the navigation of the upper river were put into good order the value of your property would increase?—I think that the canal would then be kept open and might pay a small remuneration, but unless that is done the canal must undoubtedly be closed. There is one point which I should wish to submit to the Committee which has more reference to the floods than any other, and which has not been touched upon in my examination, and that is, that pounded water is more suitable for the carriage of flood-water than that which is not pounded, and that has so important a bearing on the subject that I think it a matter worthy the attention of the Committee. I do not think that I can explain it better than in the language of a great authority on these matters, and that is Mr. Parkes. These are his words: "It was the same with a pounded river which it

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Chairman—continued.

was admitted had the effect of passing off floods more easily than an unpounded one. The effect was thus accounted for:—When a flood was passed into the pound, the discharge at the other end was brought about not by the water actually passing through the whole length of the pound, but a wave was propagated through the water, and when that wave was felt at the lower end, the discharge commenced." For instance, if you had a trough extending the whole length of this room, two feet wide, which was empty, and you pass 100 gallons of water in into the empty trough, and it has to traverse that trough and to encounter the friction of the sides and bottom, it is a long time in passing through it; but if you take the trough and fill it within six inches of the top, and pass 100 gallons of water in at one end, the 100 gallons will come out at the other end in a very much quicker time, not the same 100 gallons, but an equivalent quantity. That is the point which I am now submitting for the attention of this Committee, and it has a very important bearing on the subject of the carriage of floods in pounded water.

3715. Are those the words of an eminent engineer?—Yes.

Sir Charles Russell.

3716. Do I understand you to say that you endorse them as your own experience?—Yes.

3717. Then you are using the words of another person to express your own opinion?—I have not the slightest doubt about it. Mr. Parkes proceeds to say, "A simple calculation would show that in an ordinary case this would take place sooner than if the water had to travel bodily over the same distance along a river-bed previously dry or nearly so. Take a distance of 10 miles from A to B. If the river-bed were dry, or nearly so, as water would not flow faster than five miles or six miles an hour, it would require something like two hours for the first of the flood-water to travel from A to B. But if the length A B were occupied by a lake 18 feet deep, then the discharge would commence in such time as was necessary for the wave to be propagated from A to B over a length of 10 miles of water 18 feet deep, or at the rate which a body would attain in falling through a space equal to half the depth of the lake that was  $(8 \times \sqrt{9}) = 24$  ft. per sec., or 16 miles per hour. Thus the flood would commence at B about forty minutes after it had reached A, and nearly an hour and a half would be gained for the duration of its discharge at B."

3718. Touching the navigation and the restoration of the navigation of the river, are you aware that some few years ago an attempt was made at Reading, and from Reading downwards to start steamtugs with a view of seeing if in that portion of the river which was then most capable of navigation some trade could not be restored?—I have heard of that.

3719. Do you happen to know that they were unable to make the expenses of that traffic pay at all, even to sustain those steamtugs?—I have understood that it did not succeed. But having regard to the start that has lately been made from necessity in the management of canal traffic, that would not deter me in the least from a similar attempt being made in the upper part of the river. Formerly, for instance, with regard to the tolls on canals, canal proprietors held out

Sir Charles Russell—continued.

for high tolls, of 2 d. and 3 d. a mile. Now if you go to canals, the Oxford, for instance, where they have low tolls, you will find a farthing a ton per mile charged. Then the application of steam itself in suitable localities, is more developed now than probably it was when that attempt was made; it is impossible that I can state specific grounds upon which I say that I am not deterred unless I have all the details fully before me; but that is my general idea.

Mr. Samuelson.

3720. With regard to what you said about impounded rivers, what do you suppose would be the length of the ponds that could be applied to the Thames?—The reaches are splendid reaches in the Thames; there are four locks at present over 31 miles, and they want two or three more, I think. If you had three more that would give you eight intervals in the 31 miles.

3721. What saving of time do you consider might be effected in the passage of the floods by this system of impounding?—I cannot give you an answer to that question with any degree of accuracy; I do not think that the floods would arise but at very rare intervals, if the river were treated in that way.

3722. I think you stated that upon a length of 10 miles, the saving would be two hours?—Mr. Parkes states so in his example.

3723. And you adopt that statement?—I do: or it might be an hour and a half.

3724. Applying that to any given portion of the Thames, say between Lechlade and Oxford, for instance, what would be the saving, in how much shorter time would the flood be reduced upon that calculation?—It would be three times as quickly; it might prevent the flood if you stopped it in its initiation.

3725. Have you reflected carefully on that?—I have, indeed; I think that the cause of the flood is the first difficulty that you have got to meet; it is getting rid of the disease at its origin, you prevent its development all the way down the stream. That is the idea which I venture to lay before the Committee; I do it with great deliberation, and it is my decided opinion.

3726. That is your opinion, although it has been stated to us in evidence that the amount of water which has to be carried away with floods, is between 30 and 40 times that of the summer level of the river?—That is my identical calculation, 30 times. I might draw the attention of the Committee to the fallacy created by the report of the Thames Conservators, whose remarks in this report would lead to the idea that it was 491 times. There is a calculation here which points to that; they say in their report that the area of the catchment basin of the Thames, westward of Kew, is about 3,944 square miles. Then they say, "Supposing a rainfall of only three inches over those 3,944 square miles to find its way into the river," which is monstrous in itself, because three inches of rain never falls uniformly over so great a surface, and storm waters generally cover a very limited district, and not uniformly over so great a district as this; then they go on to say, supposing this, "there would be about 27,488,000,000 cubic feet of water to be carried off, or 491 times the amount of one day's summer discharge at Teddington Weir." That certainly points to a fallacy; 27,488,000,000 cubic feet would be equivalent

to

Mr. Samuelson—continued.

to something like 170,000,000,000 gallons, and it is quite beyond what we find it; that is under 12,000,000,000 gallons, and less than 30 times the summer flow.

3727. You stated that you had had applications for the conveyance of timber from Gloucester to Banbury; are you aware what would be the rate which you would have to accept in order to compete with the railway?—No, I gave no rate; it has been carried.

3728. Are you aware that the railway company carry timber for 8 s. per ton over the whole of that distance from Gloucester to Banbury?—I was not aware of that, but I think that might do for the water.

3729. But you charge 6 s., I think you say, from Gloucester to Lechlade?—That is on grain.

3730. Do you know what you charge on timber?—I cannot tell you; it is a question of 6 d.

3731. What is the comparative distance between Gloucester and Lechlade, and Gloucester and Banbury?—It is much further to Banbury;

Mr. Samuelson—continued.

but timber is a safer freight; there is not the same risk about it; and when you have got 30 or 40 miles on your journey, a few miles further, it does not involve an equivalent proportionate cost.

3732. Is it a question of a few miles, or is it a question of three or four times the distance?—No, certainly not.

3733. What is the distance from Gloucester to Oxford?—It is 30 miles, and 25 miles to Banbury.

3734. Then it would be nearly three times?—No; 30 miles is only from Stroud to Lechlade; then you have another 20 miles to Gloucester.

3735. Then it would be about double the distance?—About that.

Mr. Cartwright.

3736. What do you mean by saying that timber is a safer freight than corn?—Timber is not easily injured, whereas a bag of corn gets wet sometimes.

Sir FREDERICK W. E. NICOLSON, re-called.

Chairman.

3737. HAVE you a letter which you wish to hand in to the Committee?—Yes, and I will read it, with the permission of the Committee: "Thames Conservancy Offices, 41, Trinity-square, Tower-hill, E.C., 3rd July 1877. Thames Valley Floods Select Committee. To Octavius Coope, Esq., M.P. Sir,—In the evidence given by me before the Select Committee, I stated that only two communications had passed between the Thames Valley Drainage Commissioners and the Conservators. I made that statement under the impression that a thorough search had been made in this office for any correspondence between the two bodies. Owing to a misunderstanding, the only correspondence of which copies were furnished to me is that put in by Mr. Hawkins and myself when first examined. Further search has brought to light some previous correspondence, copies of which I now forward for the information of the Committee. The letter of October 1871 was written spontaneously by the Conservators to the Thames Valley Drainage Commissioners soon after the latter had been established by the Act of 1871. The letters respecting Sandford Mill in 1873 end with the

Chairman—continued.

Conservators' letter of the 26th June 1873, sending a copy of Messrs. Beardmore & Leach's report, which suggested a comprehensive scheme for improving that part of the river. The letter of the 28th September 1875 was written in consequence of an inspection by Mr. Leach and myself of the river above Oxford, respecting which district so much evidence has been given before the Committee. In conclusion, I have to express my regret that owing to my imperfect memory and to a misapprehension on the part of others, the correspondence now forwarded was not laid before the Committee when I was under examination. I am, Sir, your obedient servant, F. W. E. Nicholson, Deputy Chairman. P.S.—At the request of some of the members of the Committee, I likewise forward a table of barge tolls, and a copy of the tariff for pleasure boats, established by the Act of 1866." The Committee have copies of the correspondence. It is merely to show that we started by offering the Thames Valley Drainage Commissioners all the information in our power. We have merely cut the tariff for pleasure boats out of the Act for the convenience of the Committee.

M. J. H. Taunton.

13 July 1877.

Sir F. W. E. Nicholson.

Mr. STEPHEN WILLIAM LEACH, called in; and further Examined.

Chairman.

3738. You heard the witnesses from Iffley state that the high-water mark at Iffley Weir has been raised by the instructions of the Thames Conservancy; what have you to say upon that point?—In has not been raised at all since the year 1866.

3739. Has it been shifted since 1866?—Yes, it has been shifted from one side of the lock to the other.

3740. But is it put precisely at the same height on the other side of the lock?—Exactly the same.

3741. Not altered in the slightest degree?—  
0.114.

Chairman—continued.

Not altered in the least. There is this difference: a question had arisen as to whether it was the top or the bottom of the cast-iron plate which has been mentioned to the Committee, which was the right level. I brought that point under the notice of the Conservators some few years ago, and they directed that a plate with the broad arrow upon it should be placed, instead of the plate which had been in existence before. Such a one has been put at Iffley, but it was put at exactly the same level as it was at before. That is the only alteration that has been made. I  
c c 3 account

Mr. S. W. Leach.



Mr. S. W.  
Leach.

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1877.

Chairman—continued.

account for the flooding which has been complained of in this way: that about three or four years ago that lock was pumped out, and new under-water work was put throughout, new sills and sheet piling, and everything complete to make it perfectly water-tight. Before that there had been so much leakage through the lock that it was impossible to hold up the water to the proper level. Since this work has been done it has been held up to the proper level; and it is quite possible that it may have given the appearance of flooding which has been mentioned. I think it is quite sufficient to account for that.

3742. In altering the mark from one side to the other, are you perfectly clear, and do you wish the Committee to understand that the same level was accurately preserved?—Quite so.

3743. And that it is in no shape or way attributable to the shifting of the high-water mark that those floods have occurred?—Quite so.

3744. As regards 1866, it has been alleged that you have put timber on the top of the sill, thereby raising the height of the weir or lasher some 14 inches?—That has not been done.

3745. You deny that?—Quite. In all probability the shifting tackle has been repaired, and that was the fresh timber which a former witness spoke of. As a matter of course we are obliged to repair those things from time to time, but we have really no interest in keeping the water up to an undue height.

3746. I think I asked you a question once before as regards the effect of the tributaries on the floods in the Thames; what was your reply?—I think your question was whether similar regulations as to the opening of the weirs on the tributaries would not be desirable. I do not think I gave a very definite reply, for really my attention had never been drawn to it before. I should think it would be very desirable that similar regulations should be enforced.

3747. You think that similar rules and regulations for the management of the weirs should be enforced as regards the management of the weirs or the main river, and on the tributaries also?—Yes.

Mr. Walter.

3748. How do you reconcile your explanation as to the cause of those floods with the statement of the witnesses, that previous to the last two years, whenever they called the attention of the person in charge of the lock to the floods, he found the water was above high-water mark, and that he let off the water, but since then he has found the water still above high-water mark?—I do not know how the arrangements were carried out previous to 1866; but since 1866 the regulations under which the lock-keepers act are very rigid, and they do quite right in not altering the level of the water if the level is not higher than it should be.

3749. Is it your impression that previous to the late alteration any lock, the water was actually not kept up to high-water mark?—It could not have been. In short-water times it could not; there was so much leakage under the sills that it was simply impossible.

3750. You know that of your own knowledge?—Yes, decidedly, and it was owing to that that we pumped out and repaired the lock. I was very unwilling to advise the Conservators to do

Mr. Walter—continued.

it, because I thought if that extensive scheme of altering the river at Oxford were carried out, all that expense would be thrown away.

3751. Your conclusion from that is that if the water had been kept at its proper level previous to 1866, those meadows would have been always under water at high-water mark?—Yes, I have no doubt of it.

Sir Charles Russell.

3752. Am I right in assuming that the reason you qualify your first answer by the date of 1866, is that previous to that date you had no cognisance of what took place?—Yes, the jurisdiction of the river passed into the Conservators' hands in 1866.

3753. You had nothing previous to that to do with it?—No.

3754. Are there no records or documents which would show the condition of those things?—No, not that I am aware of.

Mr. Cartwright.

3755. What precautions did you take when you shifted the high-water mark to take care that the high-water mark was the same level?—The record is that the level of the high-water is so many feet above the sill of the lock. I think it is five feet six inches above the upper sill of Iffley Lock.

3756. Did you satisfy yourself of that by personal inspection?—I did; and not only that, but there were other levels that were taken, and by comparing those other levels with the high-water mark, I satisfied myself that no alteration had been made; it was not only the height above the upper sill, but there were other bench marks as well.

3757. What kind of supervision do you exercise over your lock-men, so as to be sure that they do not do something which you yourself would not sanction?—They have printed regulations, some of which I read to the Committee when I was examined before.

3758. Are those printed regulations issued to them?—Yes.

3759. But there is no periodical supervision to see that they carry them out, and that they do not depart from those regulations?—Yes, there is.

3760. What is that supervision?—First of all they are required to record daily the height of the water of the head-water, as well as of the tail-water at each lock; they have to prepare a return of that every month, which the superintendent on his monthly visits examines and initials.

3761. All that depends upon the report of the man in charge of the lock?—Yes.

3762. Therefore, you have no supervision, practically, over them?—The superintendent's supervision of him, of course, is only when he comes there.

3763. How often does the superintendent come there?—Once a month.

3764. During the interval the lock-keeper might raise the water unduly, might he not?—If the lock-keeper did not pay attention to the regulations he would stand a chance of being dismissed.

3765. You depend a great deal upon the report of the keepers of the locks as to their own doings?—Yes, of course.]

3766. And

*Mr. Cartwright*—continued.

3766. And a close personal supervision does not exist?—No more than what I have described.

3767. Only once a month, or at times they send you up a report, and you take their reports, and check their reports with a signature?—Yes.

3768. That signature being given in London?—No, on the spot.

3769. That is to say, the superintendent goes down, and then has the books presented to him, and he then signs those books?—Yes.

3770. Are there no local superintendents who make periodical visits, or see that the thing is done?—No, but there is this additional check, that those returns are all sent to my office, and I am in the habit frequently of comparing one with the other, and I should detect it, I think, if there was anything wrong.

3771. That is simply a clerical supervision?—Quite so.

3772. Have you ever had any reason to think that any of your lock-keepers have been doing something which is contrary to your regulations?—No, I do not remember any complaint, except in the case of Captain Owen.

3773. Have you anything to say with reference to the evidence that he wrote asking for a personal interview with the Conservators, or do you know whether any person on the part of the Conservators ever did pay any attention to that request?—I have been directed by the Conservators more than once to examine into this question of the water mark at Iffley, and I think on two or three occasions I have been to Captain Owen's office in Oxford to see him, but he was out.

3774. But you made no appointment?—No.

3775. And you took no steps to see him?—No, beyond calling upon him at his office.

*Mr. Samuelson.*

3776. You say that a question arose at the Conservancy Board as to which was the true high-water mark, the bottom or the top of the plate; which did you ultimately adopt?—The broad arrow is the mean between the two, and I adopted that.

3777. At what distance would that be from the bottom of the plate?—About two inches.

3778. So that it could not make a difference of more than two inches?—No, certainly not.

3779. With respect to the flooding of those meadows of which we have heard, you admit that it may be the case, and probably is the case, that in consequence of the works executed by the Conservators those meadows are now flooded on occasions when they would not have been flooded before?—That is the only explanation I can offer.

3780. You think that is not impossible?—I think it is.

3781. In fact it is probable, because you know that formerly water got away which you did not intend should have got away?—Quite so.

*Mr. W. H. Gladstone.*

3782. Is it not the fact that the high-water mark is fixed at such a point that the river will not overflow on to the adjoining lands?—Yes, it is. The theory upon which the high-water mark was fixed is this, that when the water rose to that level it would overflow the banks unless the tackle at the weirs were all taken out.

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*Mr. W. H. Gladstone*—continued.

3783. If that were so, does not the evidence which we have had to-day seem to show that the mark is too high?—If it is the case that the meadow is flooded when the water is up to the high-water level, so far as that meadow is concerned, it seems as though it were too high.

*Mr. Walter.*

3784. Do you know the meadow in question?—Yes, perfectly well.

3785. Is it below the bank of the river?—It is very low, and like most other meadows, the level inclines away from the river rather; I dare say it is the case that a particular portion of the meadow may be affected by the water.

*Mr. Hall.*

3786. That is the case, is it not, with other meadows?—Yes, it is.

3787. The supposition is, that you put your high-water mark in such a place, that the meadows are not under water?—As a general rule, yes.

3788. The result of the evidence that you heard the other day, leads you clearly to this, does it not, that this high-water mark must be, as far as these meadows are concerned, not too high?—It is at the level that we found it to be, and if we were to lower the level, we should immediately have the millers complaining of it, that is the difficulty we are in.

3789. I think you said that you took the high-water mark across from one side of the river to the other?—No, across from one side of the lock to the other.

3790. But it was not altered as far as the height of the water-mark was concerned, when you made that alteration?—Clearly it was not altered.

3791. Did you make any report of it?—Yes, I did.

3792. Have you any records of the alteration?—Yes, I have.

3793. And you could produce them if we want them?—Certainly.

3794. You account for this complaint of the people being flooded by saying that the lock used to leak, and that you pumped it out and repaired it; and that may be the reason why the water is higher now than it was before?—Yes.

3795. But it is quite true, is it not, that the lock does not regulate the height of the water, it is the sill of the lasher, is it not?—No; there was so much water leaked away through the lock under the sills that we could not have kept up the height; it went away; it wasted.

3796. If you wanted to regulate the height of the water at a given place, you would not touch the lock; you would go to the sill of the weir, would you not?—It would be perfectly useless to raise the sill whilst there was a leakage in the lock.

3797. Did not the water run over the sill before you repaired the lock?—Yes.

3798. Do you mean to say that there are not at present, and there may never have been, any balks put in at the top of those sills?—No, not permanently; whatever has been done has been in the way of repair. There has been no permanent obstruction of any shape or kind put in.

3799. We have evidence that those balks have been suspended on a chain, and are wound up and down; do you mean that that does not exist?

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—That

*Mr. S. W. Leach.*

13 July  
1877.

Mr. S. W.  
Leach.  
13 July  
1877.

Mr. Hall—continued.

—That exists certainly; but whatever has been done has been simply in the way of repair; there has been nothing raised. Those which have been called balks, I think, are paddle-gates; they are raised by a chain, and they have been kept exactly the same size as they were previously.

3800. How long have those balks existed?—By the look of them you would say that they must have been 60 years or 70 years old.

3801. Have there been any new ones in your experience?—No, certainly not; that weir cost me some anxiety because I was afraid it would give way.

3802. Are all those balks that people complained of, balks of 20 or 30 years old?—No, within the last two or three years; those that have been represented here as having been added have been merely small pieces of board.

3803. I thought you said they looked as though they were 60 years or 70 years old?—I meant the paddle-gates and the chains.

3804. I am talking about the balks; do you wish us plainly to understand that you deny that there are any balks, or have been any balks on the top of those sills?—I am afraid there is a little confusion about this.

Mr. Samuelson.

3805. We are speaking of moveable balks?—Then I say most distinctly that no addition has been made to anything moveable there. There are two or three places where the water is shut in, but I say distinctly that there has been no addition whatever made to any of the shifting parts, and most decidedly not to the fixed parts, that I am positive of.

Mr. Hall.

3806. What do you understand by balks?—All that I could make out from the witnesses who have been examined was that a balk meant a piece of timber on the top of the paddle-gates.

3807. On the top of the sill of the weir was the expression used?—The sill of the weir is so low that nothing could be done there without constructing a dam and pumping the water out.

3808. On the top of the overflow it is really?—Yes.

3809. And you deny putting that upon the top?—Yes, nothing more than repairing that has been done there.

3810. In those repairs has anything been done to heighten the sill over which the water flowed?—No, nothing whatever.

3811. Or to heighten the ledge over which the water flowed?—Nothing whatever.

Mr. Samuelson.

3812. So as to enable you to retain the water at a greater height than before?—No, clearly not.

Mr. Cartwright.

3813. Who executes those works?—They are executed under my direction by a foreman in the employment of the Conservators.

3814. By a man who is a local man?—He was sent down there; he had been employed in London before.

3815. And is he living down there?—Yes.

3816. Where does he live?—At Oxford.

3817. What is his name?—Sturt.

Mr. Hall.

3818. You said that you had no interest in

Mr. Hall— continued.

keeping up the supply of water; surely if it is true that the mud has accumulated, it is quite necessary, is it not, for you to take some means to get the supply of water increased over that portion of the bed of the river where the mud has accumulated in order that your barges may float?—I have had no complaint whatever of any obstruction to the navigation there, except at a spot just below Grand Pont. I have had some dredging done there; it was represented to be sewage mud coming from the main sewer at Oxford.

3819. You have heard, have you not, evidence given to-day that within the last fortnight two barges had stuck between Oxford and Iffley?—I have not heard that.

3820. They could only have stuck, I presume, owing to the accumulation of mud?—I presume so.

3821. In order to get them up again, they must be drawn up at some expense, and therefore, whoever is responsible for the navigation is interested in keeping the water up as high as it can be kept up, so as to obviate those mud-banks?—As high as it can be legally kept up.

3822. So that it is not quite correct to say that you have no interest in altering it?—I think so, quite; but if we hold the water up to an improper height we are directly responsible for the consequences.

3823. Still, the higher the water-mark, is the less trouble you have in moving the mud?—Yes, if that were altered.

3824. Supposing we were to lower the high-water mark a foot, your work would be immediately increased immensely, would it not?—To some extent; I do not think to any very great extent.

Mr. Samuelson.

3825. Have you ever found that the millers have attempted surreptitiously to raise the height of your weirs by any means?—No, never. I have never heard it alleged, except a few days ago in this room, when it was alleged that it had been done at Abingdon. That is the only time that I have ever heard it alleged.

3826. Would it be possible by a conspiracy or collusion between the mill-owner and those having charge of the weir that such a state of things could be carried out?—I would not say it is impossible, but I think there would be such complaints about it, and there are so many interests involved that we should be sure to hear of it.

3827. Have you such superintendence as to enable you to discover it?—Yes, I think so.

3828. The state of a particular weir, for instance, of Iffley weir, could not have been changed without your having become aware of it?—No, it could not, for my attention has been drawn to the state of the weir as stated just now, on account of its being in such a bad condition.

3829. Your personal attention has been directed to it for many years?—Yes, I have examined that weir, personally, several times.

Mr. Charles Praed.

3830. What is the difference in the height between the head and tail of the weir and the high-water mark at Iffley lock?—I could not answer that off-hand; I have got a record of it at the office.

3831. Then above that come the flood-gates on

Mr. Charles Praed—continued.

on the top of the sill?—Yes, that is so.

3832. Those differ in height at each weir, I suppose?—Yes.

Chairman.

3833. In reply to my inquiry, whether it would be desirable to have control over the tributaries you stated that you thought it would be?—Yes.

3834. I asked you the same question at No. 2005: "Would you advise that the tributaries of the stream up to a certain point, should also be included?" within your jurisdiction; and your reply was, "No, I think it is quite sufficient to have the main artery under the control of one body, because it is there perfectly easy, for those who are interested in the tributaries, to make use of the main artery for drainage purposes;" which reply would you wish the Committee to put stress upon?—I think I explained just now that your former question come upon me rather suddenly; I had never turned my attention to it before; but having thought of it since, I cannot help thinking that it would be advantageous that there should be a controlling power over the tributaries.

3835. And up to what extent?—I think if it were confined to seeing that the weirs and tackle at the mills were properly opened, that would be all that would be required.

3836. That the Thames Conservancy should have a control over the management of the weirs on the tributaries?—Yes. It might not necessarily be the Conservators, for in our Acts of Parliament it is provided that if the weirs are not properly opened, the district surveyor, whoever he may be, is at liberty to go to the weirs and open them, and charge any expense that may be incurred upon the Conservators; there are powers under the Act of Parliament already.

Mr. Samuelson.

3837. That is on the Thames, not on the tributaries?—No; but I say similar powers might be given with respect to the tributaries.

3838. Up to what distance?—I should think as far as the mills exist.

3839. Practically you have not paid any very great attention to the local facts and circumstances of those tributaries?—No, I have not.

3840. You merely give a general opinion that in order to deal effectively with the River Thames it would be desirable that the authority which has to deal with the River Thames should also have to deal with the tributaries?—Either that authority, or, as I mentioned just now, the district surveyor.

3841. The same powers that you have to deal with the Thames they should also have over the tributaries?—Yes. The process is this; there is a mark placed at each weir; if the Conservators fail to open the weir, so that the water shall not rise above that mark, the Act of Parliament provides that the district surveyor may open the tackle, and charge the Conservators with any expense that may be incurred; as I say, such a power as that might be conferred in the case of the tributaries.

3842. Therefore you think that the tributaries are of importance to the river?—I think that it would be for the benefit of the localities rather than for any benefit to the river.

3843. The interests of the localities are the interests of the river, are they not; what localities?

Mr. Samuelson—continued.

ties do you mean?—On the tributaries. I noticed a short time back, a little distance below Banbury, there is a mill on the Cherwell; the country was in a flooded state there, and it appeared to me that there was not much control exercised there in opening the tackle at the mill.

3844. I think you said that no complaints had reached you with reference to the passage of boats?—Quite so; none have reached me.

3845. When complaints are sent in, are they sent to the Board of Conservancy, or are they sent to you directly?—Generally speaking, they would come to me through the foreman.

3846. You are perfectly familiar with all matters of complaint; they are always referred to you, are they?—Yes.

3847. I think you gave evidence before that no complaint had ever reached you about the lashers of the weirs, with the exception of one?—Yes.

3848. How do you account for that, when the fact of Captain Owen's complaint with regard to Iffley was before you at the time you were giving your evidence, and you say yourself that there have been several referred to you, and you have been sent down and have reported on them several times; how can you explain that?—I do not exactly understand the question.

3849. You said just now that all complaints are sent to you, and that you are perfectly familiar with the complaints that are lodged with regard to anything connected with the weirs?—Yes.

3850. You also gave evidence on a former occasion, that no complaints with regard to the weirs, with the exception of the lashers of one weir, had been ever sent in; how can you reconcile it?—I think I must have referred to some other point.

3851. I think you said that no complaints had been sent in with regard to the lashers of the weirs?—I think it must have been with regard to the permanent raising of them.

3852. This complaint of Captain Owen's was a complaint on the ground of raising a lasher, and you say now that you were cognisant of that complaint?—Yes, I think so.

3853. You say now that you had to call upon him?—Yes.

3854. How can you reconcile the fact that you were so instructed to call upon him with the circumstance that you gave evidence that there were no complaints with regard to the weirs, if you were familiar with the complaints?—This complaint of Captain Owen was rather with reference to the management.

3855. Does not that tend to show that all complaints are not referred to you?—I do not think so.

3856. You say that if complaints existed you must know them?—Yes, I think I am right in that.

3857. I think that you have admitted now that you were cognisant of complaints with regard to the raising of Iffley Weir?—Yes, certainly.

3858. On a former occasion you stated in your evidence that no complaints had reached the Conservancy with regard to the raising of the weirs?—I think that is quite consistent.

3859. How could you state on a former occasion that there were no complaints with regard to the weirs when you were cognisant that there had been a complaint on the part of Captain Owen,

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Mr. S. W. Leach.

13 July 1877.

Mr. S. W.  
Leach.  
13 July  
1877.

Mr. Samuelson—continued.

Owen, and that was a complaint with regard to the raising of the weirs?—If that was so I am clearly wrong.

3860. Does not that show that you are not perfectly clear as to the amount of complaints that might have been lodged?—Of course, when I am asked a question here I am obliged to reply on the moment, and it is possible that my memory might have misled me in some particular case.

3861. That was a complaint that did attract your attention, for you said you tried to see him two or three times, although you did not call at his house, but only at his office?—I called at his office.

3862. Then there might be complaints with regard to the passage of boats, although at the present moment your memory does not recall them?—I do not think that the complaint was made at the office, because that is a point which I should have had to pay attention to immediately.

Mr. Samuelson—continued.

3863. But the other was a point which you did not consider deserving immediate attention?—I did; I attended personally to it myself. It alluded mainly to a difficulty in the navigation, such as would make a barge take the ground. That would be one case which I should be more likely to have brought under my notice by the foreman of the district than perhaps the regulation of the weirs.

3864. You think that the cutting at Teddington was made for something about 5,000 £?—No cutting has been made; but I estimate the cost of forming it at about 4,000 £, and that would be the principal work, as influencing all the rest.

Chairman.

3865. Do you think that the most important way of mitigating the floods?—Yes, as it will affect all the rest.

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# A P P E N D I X.

## Appendix, No. 1.

PAPER handed in by Mr. Taylor.

Appendix, No. 1.

### FLOOD MARKS AT STAINES IN CERTAIN YEARS.

AS TAKEN BY MR. CURTIS.

The Thames rises 376 feet above the level of the sea.

The flood mark near the railway bridge at Staines is 40 feet above the Trinity high-water mark Teddington Lock.

The top of the London Stone at Staines is 40 ft. 4 in. above the Trinity mark at Teddington Lock.

YEAR.	Day of Month.	Height of Flood.	YEAR.	Day of Month.	Height of Flood.
		<i>Ft. in.</i>			<i>Ft. in.</i>
1821	- - 17 December	7 0	1862	- - 1 April	3 11
1823	- - November	6 9	"	- - 10 May	2 8
1824	- - 7 December	5 9	1866	- - 17 January	4 3
1828	- - 19 January	5 8	"	- - February	3 11
1831	- - February	5 0	1867	- - 28 March	4 4
1841	- - 4 December	5 7	1868	- - 24 January	3 4
1848	- - 31 October	4 10	"	- - 31 December	3 3
1851	- - 28 March	3 0	1869	- - 10 January	4 0
1852	- - 18 November	6 0	1872	- - 27 January	4 0
1854	- - 11 January	3 6	1875	- - 27 January	3 2
1856	- - 5 November	2 9	"	- - 18 November	5 8
1859	- - 12 November	3 0	1876	- - 9 December	4 8
1860	- - 11 December	3 10	1877	- - 11 January	5 9
1861	- - 3 January	3 11			

AS TAKEN BY MR. HOLGATE.

River Thames at Staines ; above Trinity High-water Mark at Teddington Weir.

YEAR.	Day of Month.	Height of Flood.	YEAR.	Day of Month.	Height of Flood.
		<i>Ft. in.</i>			<i>Ft. in.</i>
1821	- - Staines	40 0	1867	- - 28 March	37 8
1823	- - "	39 9	1869	- - 1 February	37 8
1824	- - "	38 9	1872	- - 26 January	37 6
1828	- - "	38 8	1875	- - 17 November	39 0
1841	- - "	38 7	1876	- - 9 December	38 0
1852	- - 18 November	39 2	1877	- - 11 January	38 11
1866	- - 18 January	37 0			

## Appendix, No. 2.

PAPERS handed in by Sir *F. Nicolson*, 22 June 1877.

## ANSWERS TO QUERIES.

Appendix, No. 2.

Give the names of all the locks from, and including, Inglesham Round House, which I believe is your first lock, down to and including Day's Lock, below Long Wittenham.	See Statement, No. 1.
Give the receipts at each lock, year by year, to 31st December 1876.	See Statement, No. 2.
Give the salaries of each lock-keeper, and any rent, or other expenses.	See Statement, No. 3.
You have in nine years, ending 31st December 1875, expended in rebuilding of locks and weirs *67,121 <i>l.</i> 16 <i>s.</i> 10 <i>d.</i> ; out of this sum, give separately, the amounts expended on locks and weirs from Inglesham Round House to, and including, Day's Lock, below Long Wittenham.	See Statement, No. 4. Expended to 31st December 1876, 12,974 <i>l.</i> 12 <i>s.</i> 7 <i>d.</i>
Can you state if the Thames tug has been employed above Abingdon, and to what extent, and for what purpose?	Occasionally in towing empty boats up to the Oxford canal in flood time, and in conveying the superintendent on his inspections of the river.
<div style="text-align: right; margin-right: 20px;">£.   s.   d.</div> The total for purchase of plant and steam tug is -   -   -   2,834   0   6 Wages to crew, and repairs to steam tug -   -   -   2,309   11   10 <div style="text-align: right; border-top: 1px solid black; margin-top: 5px;">£. 5,233   18   4</div>	See Statement, No. 5.
Say what the "plant" there mentioned is.	
What benefit has the river above Abingdon received from this outlay?	The benefit has been spread over the whole district. The section above Abingdon has received its proportionate share.
What expenditure in dredging has been made above Abingdon?	Between 800 <i>l.</i> and 900 <i>l.</i>
In respect of what rights above Long Wittenham, and to what amounts has compensation been paid out of the total sum of 6,846 <i>l.</i> 7 <i>s.</i> 2 <i>d.</i> , paid for compensation?	See Statement, No. 6.

\* Expended to 31st December 1876 in locks and weirs, 73,253 *l.* 19 *s.* 8 *d.*

## STATEMENT, No. 1.

## THAMES CONSERVANCY.—UPPER NAVIGATION.

## Locks from Inglesham Round House to Long Wittenham.

St. John's Lock.	Osney Lock.	Abingdon Lock.
Buscot Lock.	Folly Lock.	Culham Lock.
Rushey Lock.	Ifley Lock.	Clifton Lock.
Pinkhill Lock.	Sandford Lock.	Day's Lock.
Godstow Lock.		

STATEMENT, No. 2.  
THAMES CONSERVANCY.—UPPER NAVIGATION.

TOLLS collected at the Locks from Lechlade to and including Day's Lock, from 1st January 1867 to 31st December 1876.

	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	TOTAL.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
St. John's and Buscot	22 17 9	19 12 10	41 18 8	50 6 -	24 7 -	13 15 8	9 12 3	0 4 9	17 18 1	8 8 3	218 1 3
Rushey	-	-	-	-	-	- 10 3	1 16 3	1 5 8	1 17 -	1 18 7	7 7 9
Pinkhill	47 12 4	17 - 8	18 5 2	19 2 5	20 17 4	16 9 5	16 - 6	15 1 5	15 13 2	14 16 7	200 19 -
Godstow	-	-	-	- 3 8	- 8 6	-	3 4 10	1 1 6	1 8 3	1 12 11	7 19 8
Osney*	849 7 5	871 11 5	924 17 3	913 14 11	862 13 -	822 6 1	618 16 3	558 2 7	559 16 7	548 3 3	7,529 8 9
Folly	5 11 6	7 9 6	11 14 6	34 15 1	28 2 6	17 11 9	6 17 4	9 9 8	8 17 8	8 13 10	139 3 4
Iffley	131 14 8	164 13 -	129 15 2	152 8 9	149 11 10	100 14 3	101 16 8	106 8 8	97 7 6	105 12 -	1,240 2 6
Sandford	45 19 3	50 16 6	47 6 2	52 8 5	48 19 8	29 1 -	31 11 6	32 - 6	34 3 -	33 10 11	405 16 11
Abingdon	16 1 3	17 4 10	22 6 3	23 6 3	22 14 10	12 19 10	25 7 -	17 16 10	18 7 8	24 5 7	200 10 4
Culham	61 - 6	67 16 11	67 9 11	92 18 6	115 5 2	56 7 1	45 10 1	55 1 7	35 1 2	61 18 6	648 9 5
Clifton	19 7 -	18 1 -	20 6 8	21 15 4	25 3 4	13 2 3	16 4 6	17 16 8	17 6 8	17 6 5	186 9 10
Day's	31 16 6	37 - 10	30 15 7	41 15 8	47 - 5	34 19 6	33 11 10	39 9 4	32 13 8	35 18 6	365 1 10
£.	1,231 8 2	1,261 7 6	1,314 15 4	1,402 15 -	1,345 3 7	1,117 17 1	910 9 -	862 19 2	840 10 5	862 5 4	11,149 10 7

\* The tolls collected at Osney are through tolls, downwards, for barges coming chiefly from the Oxford Canal, principally coal laden.

## STATEMENT, No. 3.

## THAMES CONSERVANCY.—UPPER NAVIGATION.

SALARIES of Lock-keepers, and Rents payable.

	Wages per Month.	Per Annum.	
	£. s. d.	£. s. d.	
St. John's Lock - - - - -	2 12 -	31 4 -	
Rushey Lock - - - - -	- 12 -	7 4 -	
Pinkhill Lock - - - - -	2 12 -	31 4 -	
Godstow and Medley Lock - - - - -	3 - -	36 - -	
Osney Lock - - - - -	5 - -	60 - -	
Folly Lock - - - - -	{ 2 12 - 3 - - }	33 12 -	{ For six winter months. For six summer months.
Iffley Lock - - - - -	4 4 -	50 8 -	
Sandford Lock - - - - -	3 - -	36 - -	
Abingdon Lock - - - - -	3 - -	36 - -	
Culham Lock - - - - -	{ 2 12 - 3 - - }	33 12 -	{ For six winter months. For six summer months.
Clifton Lock - - - - -	{ 2 12 - 3 - - }	33 12 -	{ For six winter months. For six summer months.
Day's Lock - - - - -	{ 2 12 - 3 - - }	33 12 -	{ For six winter months. For six summer months.
Day's, rent of house and land - - - - -	- - -	- - -	35 l. per annum. Less, 6 l. land let off.
			29 l.
Oxford, rent of workshops - - - - -	- - -	- - -	25 l. and taxes.
Towpath Rents - - - - -	- - -	33 11 3	

## STATEMENT, No. 4.

## THAMES CONSERVANCY.—UPPER NAVIGATION.

AMOUNTS Expended on Locks and Weirs, St. John's to Day's Lock,  
to 31st December 1876.

	£. s. d.		£. s. d.
Lechlade Foot Bridge - - -	11 - 4	Botley Bridge - - -	7 10 10
St. John's Lock and Weir - -	73 7 4	Above Oxford, } £. 2,848. 8. 11. }	
Hart's Weir - - - - -	38 19 1	Osney Lock and Weir - -	782 2 4
Lower Hart's Weir - - -	37 7 5	Oxford Four Streams - -	157 9 2
Harper's Weir - - - - -	26 2 4	Folly Lock and Weir - -	122 8 -
Old Nans Weir - - - - -	21 8 4	Iffley Lock and Weir - -	501 4 6
Rushey Weir and Lock - -	791 9 10	Sandford Lock and Weir -	1,029 5 10
Tadpole Weir - - - - -	8 8 11	Abingdon Lock and Weir -	457 12 10
Ten Foot Weir - - - - -	64 7 6	Culham Lock and Weir - -	468 12 2
Duxford and Ark Weirs - -	25 7 10	Sutton Courtney Weir - -	83 13 11
Ridge's Weir - - - - -	16 3 5	Clifton Lock and Weir - -	2,706 5 11
Skinner's Weir - - - - -	7 1 3	Day's Lock and Weir - -	3,817 9 -
Pinkhill Lock and Weir - -	131 2 9	Oxford to Day's, } £. 10,126. 3. 8. }	
Ensham Weir - - - - -	7 4 11		
King's Weir - - - - -	270 15 1		
Godstow Lock - - - - -	458 11 5		
Medley Weir - - - - -	852 - 4		
		£.	12,974 12 7

## STATEMENT, No. 5.

## THAMES CONSERVANCY.—UPPER NAVIGATION.

## PURCHASE of Plant, Steam Tug, &amp;c.

	£.	s.	d.		£.	s.	d.	
Portable engine - - - -	150	-	-	Chains, castings, timber, &c. - -	42	1	5	
Ferry boats - - - -	122	-	-	Steam engines for dredging and pump- ing.	500	2	8	
Steam engine for dredging and pump- ing.	240	-	-	Chains, &c. - - - -	44	9	8	
Barge - - - -	300	-	-		1,675	5	11	
Chains for ferries - - - -	46	17	5	Purchase of steam tug, alterations, &c.	1,150	-	7	
Sundries, fittings, timber, iron, &c. -	28	6	9					
Gear at Sutton Courtney - - -	30	-	-					
Steam pump - - - -	171	8	-					
					£.	2,834	6	6

## STATEMENT, No. 6.

## THAMES CONSERVANCY.—UPPER NAVIGATION.

## CLAIMS paid for Compensation, part of £. 6,346. 7. 2.

		Amount of Compensation.	To whom Awarded.	In respect of what Rights.
		£. s. d.		
1	St. John's Weir - - -	330 - -	W. Prideaux - - -	Loss of tolls and for unexhausted improvements.
2	Langham Weir - - -	52 10 -	St. Mary Magdalen College.	- - ditto - - ditto.
3	Pinkhill Weir - - -	200 - -	Colonel Harcourt - -	Unexhausted improvements.
4	Sandford Old Lock - -	110 - -	J. Towle - - -	Site of lock.
5	Sandford Lock - - -	552 10 -	A. B. Granville and others	} Loss of tolls and unexhausted improvements.
		137 10 -	Lea and others - -	
6	Iffey - - -	100 - -	Executors of Danbe -	Loss of tolls.
		(And an annuity of 30 l.)		
7	Abingdon Old Lock - -	283 8 9	J. S. Phillips - - -	Loss of tolls and unexhausted improvements.
	£.	1,765 18 0		

Thames Conservancy Office,  
22 June 1877.

F. Bursial,  
Secretary.

## THAMES CONSERVANCY.—UPPER NAVIGATION.

RECEIPTS and EXPENDITURE (Approximate), from Lechlade to Day's Lock, for  
Ten Years to 31st December 1876.

	£.	s.	d.		£.	s.	d.
To tolls - - - -	11,149	10	7	By Cash expended on—			
To ballast licences - - -	60	-	-	Locks and weirs, as per Statement, No. 4	12,974	12	7
				Wages to lock-keepers - - -	4,000	-	-
				Rents, Oxford and Day's Lock, less amount received.	610	-	-
				Paid for claims for compensation and ex- penses of arbitration.	2,752	18	9
				Rent of tow-paths - - - -	300	-	-
				Dredging - - - -	900	-	-
				Repairs to tow-paths, bridges, gates, &c., over the district, Lechlade to Staines, 116 miles, £. 7,586; proportion of above for 55 miles, between Lechlade and Day's Lock, at 65 l. 8 s. per mile.	3,575	-	-
£.	11,209	10	7	£.	25,112	11	4

No charge included in the above for expenses of service, management, repayment of loans, interest, &c.

## THAMES CONSERVANCY.—UPPER NAVIGATION.

AMOUNTS Expended on Locks and Weirs, Benson to Bell Weir Lock,  
to 31st December 1876.

From Days Lock :	£.	s.	d.		£.	s.	d.
Benson Lock and Weir -	3,812	8	1	Hurley Lock and Weir -	957	12	1
Crowmarsh Weir - -	808	17	5	Temple Lock and Weir -	1,479	8	8
Chalmore Hole Lock and Tumbling Bay.	171	15	7	Marlow Lock and Weir -	1,852	4	6
Cleve Lock and Weir - -	2,378	12	3	Cookham Lock and Weir -	2,936	7	10
Goring Lock and Weir -	1,683	15	4	Boulter's Lock and Weir -	2,847	2	5
Whitechurch Lock and Weir	3,003	18	5	Bray Lock and Weir - -	507	15	-
Mapledurham Lock and Weir	985	5	1	Boveney Lock and Weir -	3,704	-	6
Caversham Lock and Weir -	2,666	7	11	Romney Lock and Weir (Lock close to Eton, just below Windsor).	7,191	-	6
Blakes' Lock - - -	250	17	8	Old Windsor Lock and Weir	6,483	14	5
Sonning Lock and Weir -	1,630	2	1	Bell Weir Lock and Weir -	6,797	8	3
Shiplake Lock and Weir -	2,642	7	5	Sundries - - - -	208	2	-
Marsh Lock and Weir - -	1,489	15	2				
Hambledon Lock and Weir -	3,765	7	6		£.	60,279	7 1

## THAMES CONSERVANCY.—UPPER NAVIGATION.

BARGE and PLEASURE TRAFFIC, 1867 to 1876.

YEARS.	BARGE.	PLEASURE.	TOTAL.
	£.	£.	£.
1867 - - - - -	2,550	1,020	3,570
1868 - - - - -	2,780	1,186	3,966
1869 - - - - -	2,731	1,316	4,047
1870 - - - - -	2,570	1,507	4,077
1871 - - - - -	2,527	1,661	4,188
1872 - - - - -	2,481	1,147*	3,628
1873 - - - - -	2,104	1,420	3,524
1874 - - - - -	1,999	1,768	3,767
1875 - - - - -	1,612	1,890	3,702
1876 - - - - -	1,772	1,991	3,763
£.	23,326	14,906	38,232
Average per annum - £.	2,332	1,490	3,822

\* The new scale of charges for pleasure boats came into force, 1st April 1872.

Rates on grain, flour, and manure, from London (upwards) were reduced by order of the Board, 7th November 1870.

Rates on grain, flour, and timber to London, reduced, 17th May 1871.

18 May 1871.



# THAMES CONSERVANCY.—LOWER NAVIGATION. - - -

AN ACCOUNT of MONIES Received and Expended by the CONSERVATORS of the RIVER THAMES,  
Dr.

	£.	s.	d.
To Balance, 31st December 1875 - - - - -	21,835	9	3
To Cash: Received for tonnage dues - - - - -	31,889	10	2
„ „ Received for tolls - - - - -	7,226	-	11
„ „ Received for pier dues - - - - -	7,947	17	10
„ „ Received from Water and Canal Companies - - - - -	2,500	-	-
„ „ Received for rents above Teddington - - - - -	164	12	1
„ „ Received for rents for accommodation - - - - -	5,388	16	2
„ „ Received for fines for accommodation - - - - -	1,240	10	-
„ „ Received for ballast licenses :—			
Westward of London Bridge - - - - -	231	15	-
Eastward of London Bridge - - - - -	516	6	2
Royalty on ballast - - - - -	180	10	2
	928	11	4
„ „ Received for sale of ballast - - - - -	50	2	4
„ „ Received for dividends on Stock (57,161 l. 11 s. 9 d. Reduced Three per Cents., less Income Tax) - - - - -	1,696	19	8
„ „ Raising and removing wrecks and obstructions - - - - -	9,320	3	11
„ „ Laying down and repairs to moorings - - - - -	1,087	19	3
„ „ Assessors' fees - - - - -	139	13	-
„ „ Interest on Banker's balance - - - - -	352	9	8
„ „ Penalties inflicted on offenders under the Thames Conservancy Acts - - - - -	118	19	5
„ „ Hire of dredger - - - - -	228	-	-
	£.	92,115	15 -

## CAPITAL ACCOUNT, 30th December 1876. - - -

	£.	s.	d.
To Cash borrowed on the security of tolls on the Navigation of the River Thames, Westward of London Bridge - - - - -	105,600	-	-

22 March 1877.

## - - - - THAMES CONSERVANCY.—LOWER NAVIGATION.

under the Thames Conservancy Acts of 1857 and 1864, for the Year ending 30th December 1876.

Cr.

	£.	s.	d.	£.	s.	d.
By Cash: Salaries to secretary and clerks, 41, Trinity-square - - -	2,210	-	-			
" " Stationery and postages - - ditto - - -	272	16	6			
" " Wages to housekeeper, messengers, rates, taxes, and coals - - -	774	15	2			
				8,257	11	8
" " Salaries to engineer, surveyors, draughtsman, clerk, and wages to watermen - - -	2,308	12	2			
" " Wages to foremen - - -	604	6	-			
" " Stationery for engineer's office and expenses - - -	154	16	2			
				3,062	14	4
" " Salaries to harbour masters, wages to watermen, rent and taxes on offices, and repairs to boats - - -				5,309	12	1
" " Salary to foreman of moorings, wages to workmen employed in lighters, at the Port of London Wharf - - -				1,837	19	10
" " Expenses in connection with dredging - - -				20,262	5	5
" " Dredging above Bridge - - -				3,894	15	5
" " Salaries to collectors of tonnage dues, tolls and rents, and wages to lock-keepers - - -				1,976	3	11
" " Salaries to river-keepers and inspectors, and their travelling expenses - - -				989	2	10
" " Stores for harbour service - - -				1,228	-	10
" " Screws, chains, and buoys for moorings and repairs - - -				5,298	2	6
" " Material and wages to labourers for repairs to locks, weirs, and towing-paths - - -				3,417	5	7
" " Material and wages to labourers for repairs to causeways and foreshores - - -				565	2	6
" " Law and Parliamentary expenses - - -				302	-	7
" " Raising and removing wrecks and obstructions - - -				6,230	5	7
" " Pensions - - -				767	1	7
" " Erecting and repairing steamboat piers - - -				5,970	18	-
" " Wages to piermasters and men - - -				4,974	15	-
" " Interest on Navigation Bonds (including the sum of 272 l. 3 s. 2 d. unclaimed at this date) - - -				3,687	19	7
" " Travelling expenses on surveys - - -				280	8	10
" " Allowance to the Conservators - - -				1,800	-	-
" " Sundry donations and expenses - - -				295	2	-
" " Assessors' fees - - -				162	4	6
" " Expenses of elections - - -				107	4	11
" " Beacons - - -				16	4	4
" " Her Majesty's Commissioners of Woods and Forests, one-third of rents, 1875 - - -				1,758	9	2
" " Her Majesty's Commissioners of Woods and Forests, one third of fines, 1875 - - -				944	3	4
" " Her Majesty's Commissioners of Woods and Forests, composition for ballast licenses - - -				500	-	-
" " Wages to crews and expenses of steam tugs - - -				1,286	1	-
" " Purchase of and repairs to plant - - -				24	17	-
" " Expenses in connection with compensation for offices, 41, Trinity-square - - -				44	1	8
Balance carried forward - - -				11,915	1	7
	£.			92,115	15	-

## - - - - CAPITAL ACCOUNT, 30th December 1876.

	£.	s.	d.
By amount of Reduced Three per Cents. - - -	57,161	11	9

Examined and approved,  
T. J. Bagent, Auditor

## THAMES CONSERVANCY.—UPPER NAVIGATION. - - - -

*Dr.* AN ACCOUNT of MONIES Received and Expended by the CONSERVATORS of the RIVER

	REVENUE.	TOTAL.
	£. s. d.	£. s. d.
To Cash : Tolls - - - - -	3,909 11 1	
„ „ Contributions from Water Companies - - - - -	6,550 - -	
„ „ Ballast licenses - - - - -	47 10 -	
„ „ Sundries - - - - -	102 3 11	10,609 5 -
To Balance - - - - -	- - -	10,738 2 7
	£.	21,347 7 7

## CAPITAL ACCOUNT.—RECEIPTS and EXPENDITURE

	£. s. d.
To Cash Received from Public Works Loan Commissioners - - - - -	40,000 - -
„ „ Received from Her Majesty's Commissioners of Woods and Forests, being a contribution towards the expense of re-building Romney Lock - - - - -	2,000 - -
„ „ Received for sale of land - - - - -	100 - -
„ „ Received from Her Majesty's Commissioners of Woods and Forests towards the expense of re-building Old Windsor Weir - - - - -	1,000 - -
„ „ Received from Her Majesty's Commissioners of Works towards the expense of re-building Old Windsor Weir - - - - -	500 - -
„ „ Received, borrowed from Thames Conservancy Fund - - - - -	8,804 11 -
	52,404 11 -
To Balance - - - - -	124 - 4
	£. 52,528 11 4

## RECEIPTS AND EXPENDITURE (REVENUE AND CAPITAL ACCOUNTS)

RECEIPTS.	REVENUE.	CAPITAL.	TOTAL.
	£. s. d.	£. s. d.	£. s. d.
To Amount received to 31st December 1875 - - - - -	88,235 13 3	43,600 - -	131,825 13 3
„ „ Amount received to 30th December 1876 - - - - -	10,609 5 -	- - -	10,609 5 -
	£. 98,834 18 3	43,600 - -	142,434 18 3
To Balance - - - - -	- - -	- - -	10,738 2 7
		£.	153,173 - 10
To Cash received from Thames Conservancy Fund - - - - -	8,804 11 -		
„ Warrants unpaid - - - - -	726 6 3		
„ Amount due to City Bank, &c. - - - - -	1,207 5 4		
	£. 10,738 2 7		

22 March 1877.

## THAMES CONSERVANCY.—UPPER NAVIGATION.

THAMES under the Thames Navigation Act, 1866, for the Year ending 30th December 1876.

Cr.

	CAPITAL.			REVENUE.			TOTAL.		
	£.	s.	d.	£.	s.	d.	£.	s.	d.
By Balance, 31st December 1875	-	-	-	-	-	-	6,950	10	7
" Cash : Law Expenses	-	-	-	423	1	1			
" " Wages to lockkeepers, ferrymen, and expenses	-	-	-	1,576	18	1			
" " Salary to superintendent, and his travelling expenses	-	-	-	354	16	2			
" " Wages to labourers and material for building and repairing locks	4,300	3	3	688	18	-			
" " Ditto - ditto - ditto - for weirs				1,136	1	7			
" " Ditto - ditto repairing tow paths				724	14	6			
" " For dredging	-	-	-	104	3	3			
" " Repairing boats	-	-	-	22	16	1			
" " Expenses, tug and launch	-	-	-	99	16	7			
" " Stationery and advertising	-	-	-	62	6	10			
" " Travelling expenses	-	-	-	86	19	10			
" " Survey of river	-	-	-	26	8	4			
" " Rent of premises at Oxford and Day's Lock	-	-	-	63	10	11			
" " Conservators' allowance	-	-	-	700	-	-			
" " Sundries	-	-	-	94	4	4			
" " Interest on loans	-	-	-	6	4	11			
" " Paid Public Works Loan Commissioners, being instalment on loan of 30,000 £.	-	-	-	955	16	11			
" " Interest on ditto	-	-	-	1,219	15	6			
" " Compensation Annuities	-	-	-	58	3	7			
" " Towing path rents	-	-	-	155	6	11			
£.	5,033	17	9	9,362	19	3	14,396	17	-
							£.	21,347	7 7

from 6th August 1866 to 30th December 1876.

	£.	s.	d.	£.	s.	d.
By Cash, Expended to 31st December 1875, as per statement rendered	-	-	-	47,494	13	7
" " On account of re-building Hurley Weir	-	-	-	2	9	3
" " On account of re-building Caversham Lock	-	-	-	167	5	7
" " On account of re-building Temple Weir	-	-	-	106	14	9
" " On account of re-building Crowmarsh Weir	-	-	-	49	9	6
" " On account of re-building Hambledon Weir	-	-	-	54	8	5
" " On account of re-building Boveney Lock	-	-	-	806	1	-
" " On account of re-building Hurley Lock	-	-	-	27	3	5
" " On account of re-building Whitchurch Lock and Weir	-	-	-	2,238	7	4
" " On account of re-building Marlow Weir	-	-	-	855	4	-
	4,300	3	3			
" " On account of repairing tow path, Old Windsor	724	14	6			
				5,033	17	9
£.				52,528	11	4

from 6th August 1866 to 30th December 1876.

EXPENDITURE.	REVENUE.			CAPITAL.			TOTAL.		
	£.	s.	d.	£.	s.	d.	£.	s.	d.
By Amount expended to 31st December 1875	91,281	10	3	47,494	13	7	138,776	3	10
" Amount expended to 30th December 1876	9,362	19	3	5,033	17	9	14,396	17	-
£.	100,644	9	6	52,528	11	4	163,173	-	10
							£.	153,173	- 10

Examined and approved,

T. J. Regent, Auditor.

Office of the Thames Valley  
Drainage Commissioners, Town Hall, Oxford,  
2 January 1877.

Sir,

REFERRING to the Accounts of the Conservators, published and presented to the House of Commons under 20 & 21 Vict. c. 47, I am directed by the Thames Valley Drainage Commissioners to ask the Conservators to be so good as to afford them some information on certain parts of Income and Expenditure.

Taking the Upper River Accounts from January 1867 to December 1875, it appears that the Conservators have spent in rebuilding and repairs of locks and weirs the sum of 67,121 l. 16 s. 10 d. In the Capital Accounts it appears on what locks and weirs 40,641 l. 8 s. 5 d. of this sum was spent; this leaves a sum of 26,480 l. 8 s. 5 d., in respect of which the particulars of the expenditure are not given.

1. Can the names of the locks and weirs on which this was expended, and the amount apportioned to each lock or weir be given?

2. Next, during the same period there was expended for purchase of plant and steam-tug, 2,834 l. 6 s. 6 d.; wages to crew and repairs, 2,399 l. 11 s. 10 d., making a total of 5,333 l. 18 s. 4 d.

3. Can you state if this steam-tug has been employed above Abingdon, and for what periods? Secondly, what were its earnings?

4. The dredging during the same period amounts to 3,172 l. 2 s. 9 d.; what portion of this cost represents dredging done above Abingdon?

5. Then the awards for compensation have amounted to 6,346 l. 17 s. 2 d.; can the different places at which the rights in respect of which the compensation was given be furnished, with the sums apportioned to each place?

On the Credit side it appears that the Conservators have received 35,566 l. 15 s. 4 d.; can the above amount be divided so as to show the amount of tolls taken at each lock?

The Commissioners would be greatly obliged if the Conservators would authorise you to furnish them with the above information.

E. Burstal, Esq.,  
Secretary, Thames Conservancy.

I am, &c.  
(signed) R. S. Hawkins,  
Secretary to the Commissioners.

Thames Conservancy, 41, Trinity-square, E.C.,  
13 January 1877

Sir,

I HAVE laid your letter of the 2nd instant before the Conservators of the River Thames, who direct me to state in reply thereto that their accounts have been published in accordance with the requirements of Parliament, and that they must decline to comply with the request made by you for details of works executed and explanations of items of expenditure.

R. S. Hawkins, Esq.,  
Secretary of the Thames Valley Drainage  
Commissioners, Oxford.

I am, &c.  
(signed) E. Burstal,  
Secretary.

## Appendix, No. 3.

PAPER handed in by Mr. *Hawkins*.—(Referred to in Question 2808.)

PARTICULARS of Meetings of the THAMES VALLEY DRAINAGE COMMISSIONERS, Appendix, No. 3.  
required by the Select Committee of the House of Commons, Thames Valley Floods  
Prevention.

D A T E.	Number of Commissioners present.	Special Business Transacted.
1871 :		
9 Aug. -	16	First meeting, elect Chairman and appoint Committees. Committee to ascertain limits of jurisdiction appointed.
9 Sept. -	24	
7 Oct. -	12	
14 „ -	20	Reports from Committees, &c.
11 Nov. -	18	Proposal to employ the Ordnance Department to do surveys.
18 „ -	10	
9 Dec. -	7	Contract with Board of Works adopted.
1872 :		
10 Feb. -	8	No meeting.
9 Mar. -	8	
13 April -	10	
11 May -	2	Sandford Mill having been burnt, attempt made to try and arrange for the lowering of the head water level ; committee appointed.
8 June -	8	
13 July -	22	
22 „ -	6	
10 Aug. -	5	
14 Sept. -	6	
12 Oct. -	6	
9 Nov. -	5	
14 Dec. -	8	
1873 :		
11 Jan. -	9	From December 1871 to June 1875 the Ordnance were engaged in the Surveys, &c.
13 „ -	14	
8 Feb. -	8	
8 Mar. -	6	
12 April -	8	
10 May -	7	
14 June -	9	
30 „ -	11	
12 July -	7	
12 Aug. -	6	
13 Sept. -	8	
11 Oct. -	5	
8 Nov. -	8	Notice ordered to be given to apply to Parliament for an Act extend- ing time for making first Order.
12 „ -	10	
13 Dec. -	9	
29 „ -	12	
1874 :		
10 Jan. -	7	
14 Feb. -	9	
14 Mar. -	8	
11 April -	5	
9 May -	10	
13 June -	6	
27 „ -	15	
11 July -	7	
8 Aug. -	5	
10 Oct. -	9	
14 Nov. -	9	
12 Dec. -	11	



## Appendix, No. 3.

DATE.	Number of Commissioners present.	Special Business Transacted.
1875:		
13 Feb. -	10	Print of rules as to qualification and tenure of Members of District Boards approved.
13 Mar. -	7	
10 April -	6	
8 May -	6	
12 June -	3	
10 July -	3	Petition to Inclosure Commissioners to send Inspector preparatory to their giving their consent to the first Order of the Commissioners.
14 Aug. -	11	
8 Sept. -	14	
1 " -	10	
9 Oct. -	6	
13 Nov. -	9	The Inclosure Commissioners' Inspector began to hold his Meetings on the 16th October 1875.
20 " -	11	
11 Dec. -	10	The seven Books of Assessment prepared by the Secretary produced, and notice of assessment ordered.
1876:		
15 Jan. -	6	The County having indicted the Ecclesiastical Commissioners for non-repair of Islip Bridge, and that Bridge being known from its narrow waterway to be a bar to any improvement to the Drainage of Otmoor, the First Commissioners agreed with the Ecclesiastical Commissioners (in consideration of the latter contributing 500 £), to pull the old bridge down, and build a new bridge with more than double the waterway, and to deepen and widen the channel of the river.
5 Feb. -	5	
24 " -	11	Meeting to hear objections to first Assessment.
11 Mar. -	11	Meeting to further consider objection to Assessment and decide on.
8 April -	5	Assessment sealed.
4 May -	13	Estimate sealed and rate ordered.
16 " -	6	
7 June -	11	On the 25th July the elections of the District Boards were held.
8 July -	13	
29 " -	12	Report from Messrs. Falkner and Tancred read and referred back to them with suggestion of additional information, and then to be printed and sent to District Boards for their consideration.
26 Aug. -	9	Places of Meetings of District Boards fixed.
7 Oct. -	14	First Meeting of Elected Commissioners. Notice of Motion given to appoint an Engineer.
9 Dec. -	18	Report of Secretary as to ways and means of meeting future expenditure considered. Notice of Motion as to appointment of Engineer postponed till next Meeting in order to get in reports of District Boards.
1877:		
27 Jan. -	22	Reports of District Boards. Committee appointed to confer with Sir John Hawkshaw.
24 March -	14	Negotiations with Sir John Hawkshaw suspended in view of the action of the Government in appointing Committees in the House of Lords and the House of Commons; Districts 2 and 4 authorised to proceed to arterial works, except on the Thames.
9 June -	16	

The list gives the meetings of the Commissioners only; a great deal of work was done by Committees, the meetings of which were very numerous.

## Appendix, No. 4.

PAPER handed in by Mr. *Hawkins*.

## THAMES VALLEY DRAINAGE ACTS, 1871 AND 1874.

## STATEMENT of RECEIPTS and EXPENDITURE of the COMMISSIONERS to 8th December 1876.

RECEIPTS.			EXPENDITURE.		
	£.	s. d.		£.	s. d.
Parsons & Co., loans - - - -	6,000	- -	Expenses in obtaining Act of 1871 - -	1,908	13 11
Treasurer received on account of Rates made 16th May 1876.	10,586	1 7	Ditto - - ditto - 1874 - -	653	10 -
			Survey, Plans, &c. - - - -	4,537	10 7
			Correction of names of Owners and Occupiers in Reference Books, involving practically new references over 55,472 acres, and making out first assessment in seven Books, and preparing two entire sets of 6-inch Plans for Inclosure Commissioners and Thames Valley Drainage Commissioners, the work extending over a period of eighteen months, and including pay of staff of Reference Clerks, their travelling expenses, and all correspondence and Secretary's superintendence.	1,034	- 10
			Inquiry by Inclosure Commissioners, their costs of.	309	19 9
			Secretary, General, Law, and other Charges, from June 1871 to May 1876, including making and collecting Rate.	580	12 1
			Clerk to Cirencester Committee, ditto ditto -	157	3 9
			Interest on Loans - - - -	692	8 5
			Loans repaid out of Rate - - - -	6,000	- -
			Rent of Offices - - - -	107	17 6
			Advertising - - - -	37	3 9
			Stationery and Printing - - - -	135	3 6
			Miscellaneous - - - -	99	5 2
				16,253	19 3
			Balance - - - -	332	2 4
£.	16,586	1 7	£.	16,586	1 7

## RATE ACCOUNT.

	£.	s. d.		£.	s. d.
Rate of 3s. 10d. per acre, made 16th May 1876.	10,646	17 7	Amount received by Treasurer - - -	10,586	1 7
Amount paid in excess of Rate, and to be refunded to Ratepayers.	10	14 2	Rates charged on Common Lands and otherwise found irrecoverable or in error.	71	10 2
£.	10,657	11 9	£.	10,657	11 9

## Appendix No. 5.

Appendix, No. 5.

PAPER handed in by Mr. Leach.

## THAMES CONSERVANCY.

REPORT of Mr. *Beardmore* and Mr. *Leach*, Civil Engineers, in compliance with the Order of the Board, 7th February 1867, directing a Report on any Alteration or Improvement which can be suggested to benefit the Locality of OXFORD by Relief from FLOODS.

To the Honourable the Conservators of the River Thames.

Gentlemen,

THE condition of the land drainage with regard to the escape of floods from the low-lying district which, to a considerable extent, surrounds the City of Oxford, and the remedy which might be applied to the existing defects, is the subject of the following Report in accordance with your order of the 7th February 1867, directing us to report on any alteration or improvement we can suggest to benefit the locality.

The Valley of the Thames which surrounds Oxford on the north, south, and west, is not only subject to inundation, but is so circumstanced that the floods which visit it are retained for an undue and unnecessary period in a stagnant condition, saturating the ground and causing exhalations which unquestionably must be deleterious to the health of those residing within their influence. Nor is the evil confined to the periods of actual visitation by the floods, for even after the continued prevalence of dry weather, copious mists arise from the marsh lands lying near the city, not merely conveying the idea of insalubrity, but of necessity producing that result. We have no doubt that the existing defects have been produced in the course, it may be perhaps of many centuries, by encroachments gradually made, for it is unquestionable that the founders of the cities and towns on the Thames exercised so wise a choice in the localities they selected that they would have avoided a spot open to the objections which now exist to the situation of Oxford.

The mode of treatment we suggest will have the effect of restoring the river practically to its original condition, and the result will be, that while any existing defects in the navigation will be removed, the far more important evils arising from the want of drainage of the land and subsoil will be effectually remedied.

Careful personal surveys, aided by the accurate plans and levels taken by your surveyors, with special reference to this subject, have convinced us that the evils we have indicated (which might indeed be enlarged upon) are capable of a perfect remedy.

The whole district is traversed by streams and water-courses, all ready to do their part in the required drainage, and, with moderate cleansing and deepening, the formation of one deep arterial channel to which they may all gravitate, is only needed to make them perfectly efficient.

This plan recommends itself alike by its completeness and simplicity, for it demands only the adaptation of existing means, presents no difficulties that may not be readily overcome, and is practicable at an expense that we believe will be considered moderate when compared with the great extent and value of the area over which beneficial results will be enjoyed.

For about two miles below Eynsham Bridge down nearly to King's Weir, the river consists of one deep and capacious stream fully adequate to the passing of floods when a few shoals have been removed.

Just before reaching the King's Weir, the Wytham Stream leaves the main channel. This stream is the first of numerous inefficient and circuitous branches by which the drainage of the valley is carried through the Oxford district for a distance of seven and a quarter miles.

These

These branches have various confluences among themselves, and do not finally unite until just above Sandford Mill, whence the entire drainage of the valley flows on in a single broad channel nearly to Abingdon, a distance of 13½ miles from Eynsham Bridge.

The part therefore which, in our judgment, is that which must be dealt with in order to benefit the city and suburbs of Oxford, extends from King's Weir to Sandford.

King's Weir should be rebuilt on an improved plan. This work is necessary for the purpose of holding up the head of water required for the navigation from the Oxford Canal to Eynsham, and for the Mills at Wytham and Wolvercote. Its power to discharge floods should be greatly increased.

Below King's Weir, towards Godstow Lock, the channel has been for many years disused for navigation, and is, consequently, in several places, choked up. Such obstructions should be removed, and so also should the fishing bucks at Godstow Bridge. Godstow Lock might be repaired and lowered at a moderate expense, to suit the improved level of the river; but it is now impassable, and the traffic of the river above King's Weir is carried for a short distance through the Oxford Canal, so that there is no absolute necessity for its maintenance.

Below Godstow Lock the river, as it skirts Port Meadow, is of ample width, but is greatly obstructed by shoals, which should be removed, together with Medley Weir. The Port Meadow, which is now even in summer scarcely raised above the surface of the river, would thus be effectually relieved of the flooding, from which it suffers greatly.

The next material obstruction is presented by the Bodley Bridge. The middle arch, with the massive piers on each side, should be removed, and a girder bridge of one span be substituted for the three arches. The stream down to Osney Lock should be deepened, and an efficient weir be substituted for the present paddle gates.

From Osney Lock to Sandford we recommend an entire alteration in the existing condition of the river. The main feature of this alteration would be the removal of Iffley Lock, as well as of that at the Folly Bridge, and the somewhat extensive deepening of the bed of the river, which would be rendered necessary by taking away these locks.

This deepening would give full vent for flood waters by the main channel, and prevent their drowning the land by means of the various branches through which floods now direct their course.

Beginning at the upper end, it would be necessary to rebuild Osney Lock. It is too shallow even in the existing state of the river, not having a depth of three feet at times of low water, and needs extensive repair. The new lock should be eight feet deeper.

Dredging would have to be done between Osney Lock and Folly Bridge, and, if practicable, the projecting points on the river cut off, as we have shown them on the plan.

The Grand-pont Mill, formerly the City Water Works, and the adjoining weir, situate just above Folly Bridge, should be removed, and that stream be made the main channel. The present Folly Lock should be so far altered as to serve for an additional escape for flood water.

The projecting angle at the upper end of the Christ Church Meadow should be taken off. From this point down to Iffley a considerable quantity of dredging will have to be done, and more particularly in the first half mile below Folly Bridge, where the deepening of the river would have to be extended almost from side to side.

At Iffley, we propose that the lock and mill should be entirely removed; this will immediately deprive the Weirs Mill of its head of water; the mill itself is in a dilapidated condition and its fall is small in the dry season, while during wet periods there is no available power.

The removal of Iffley Lock and Mill, taken with the proposed alteration at the Folly Bridge Lock and the Grand-pont Mill, will give an uninterrupted reach of water extending from Sandford to Osney, a length of about 3½ miles, very much facilitating navigation, and offering a great improvement for the amateur boating so much valued as a recreation for members of the university.

Between Iffley and Sandford the abrupt bend near Rose Island should be obviated by forming a new course for the river through the short neck of land at that spot. If thought desirable by the owners of adjacent lands between Folly Bridge and Sandford, it would be easy to widen the towing path so as to form a good carriage road with the large amount of surplus dredging taken out of the bed of the river.

When all these facilities for the escape of flood water come to be carried out, the millers at Sandford will no doubt assert that the floods would be brought down more quickly upon them. To obviate such a complaint, additional facilities for the escape of floods may be provided by increasing the width of the river where it is now somewhat confined below the several old locks and tumbling bays at Sandford. More dredging than has yet been done should also be effected on the shoals at Radley Common.

To render these works still more complete, it would be very desirable to restore to the Culham Stream some of the flood-discharging capacity which in the course of years it appears to have lost. It would be necessary to lower considerably the existing dam at the top of the stream, making provision by moveable tackle for the maintenance of a proper head of water for the navigation and the mill at Abingdon.

Having thus described the alterations in the main drainage of the valley, and the works

Appendix, No. 5, which will be necessary to effect them, we will now state what will be their cost, according to the following estimate:—

	£.	s.	d.
For rebuilding King's Weir, the alteration of Botley Bridge, the reconstruction and enlargement of the weir near Osney Lock, rebuilding Osney Lock, removal of the weir at Grand-pont Mill, adapting Folly Lock to the passage of flood-water, removal of Iffley Lock, the enlargement of the Tumbling Bays, &c., at Sandford - - - - -	10,550	-	-
Dredging shoals and deepening the bed of the river from King's Weir to Sandford, making the new cut near Rose Island, and dredging shoals at Radley Common - - - - -	12,530	-	-
Excavations in cutting off bends - - - - -	5,007	-	-
Purchase of land so cut off, and compensation in respect of Grand-pont Mill, the Weirs Mill, and Iffley Mill - - -	6,875	-	-
	£.	34,962	- -
Add 10 per cent. - - - - -		3,496	- -
	£.	38,458	- -
Less for Navigation works only in the district as described in our former Report - - - - -		11,200	- -
	£.	27,258	- -
Improvement of Old Culham River, and Weirs above Abingdon		2,500	- -
Nett Cost of Works for Relief of Floods - - - - -	£.	29,758	- -

In our Report of 7th January 1867, we suggested the carrying out of certain works for the special improvement of the navigation within the limits described in this Report; their estimated cost was 11,200 *l.*, and they form a portion of the larger works which we now recommend. Deducting, therefore, this amount from the estimate we make for the much more extensive scheme now submitted to your consideration, the sum of 29,758 *l.* would be the special cost of the drainage of the extensive district, which would be benefited by the improvements we suggest, as shown in the foregoing statement.

The result of the carrying out of these works would be equivalent to raising the whole surface now subject to inundation from 2 feet 6 inches to 3 feet above its present level.

Ordinary floods would be carried off by the deepened channel, and high floods would be enabled to pass away rapidly, and the stagnation of waters on the marshes and saturation of the ground would be prevented.

With regard to the means of obtaining the amount required for carrying out these works, we find that about six thousand acres of land, more or less liable to floods, would derive benefit from the drainage facilities afforded by the suggested expenditure, in addition to the City of Oxford and a large area bordering upon the Thames Marshes not absolutely flooded.

Although we have adopted King's Weir as the upper limit of the district dealt with in this Report, we are all well aware that a similar treatment of the river beyond—subject as it is to extreme flooding—would be followed by most beneficial results; but as no survey has been made on which the proposed works could be indicated, we have not entered upon the consideration of the necessary works.

We have prepared a map and section to accompany this Report, describing the district and works referred to.

Yours, &c.  
(signed) *Nath. Beardmore.*  
*Steph. Wm. Leach.*

9 January 1869.

**I N D E X**

**TO THE**

**R E P O R T**

**FROM THE**

**SELECT COMMITTEE**

**ON**

**THAMES FLOODS PREVENTION.**

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*Ordered, by The House of Commons, to be Printed,  
27 July 1877.*

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I N D E X.

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*Capital Account (Thames Conservancy).* Large debt contracted by the Conservators in respect of the upper river, *Hawkins* 479–481—Non-recognition by the Conservators of an old debt of 88,400 l. incurred by the old Commissioners, *Sir F. Nicolson* 2468–2470—Total debt of 88,400 l. upon the district above Staines in 1866; further debt raised by the Conservancy, the latter, however, being gradually reduced, *ib.* 2912–2918. 2930, 2931.

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*Castle, Robert.* (Analysis of his Evidence.)—Is a land agent and surveyor at Oxford, and has had twenty-five years' experience of the land adjoining the river; is in no way connected with the Thames Valley Drainage Commission or Thames Conservancy, 993–998.

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*Damage from Floods.* See *Floods*.

*Darvill, Henry.* (Analysis of his Evidence.) — Experience of witness for twenty-five years as town clerk of Windsor; he has resided in the neighbourhood for upwards of forty years, 1383-1386 — Total of fifteen members (of whom witness was one) on the former commission

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Expediency of rates for the necessary flood works being confined to those injured by the floods; way in which the damage might be assessed in each locality, 1483-1496.—Doubt as to the expediency of a navigation tax upon pleasure boats, 1504-1509.

*Day, Henry.* (Analysis of his Evidence).—Is deputy town clerk of Reading; has been connected with the town for some twenty years, 1556, 1557.—Injury caused to houses in the town by floods in the Kennet and the Thames, 1558-1560.—Statement to the effect that, as a result of the Thames Conservancy Act of 1866, taxation to the amount of about 2 *s.* 6 *d.* in the pound has been imposed on Reading by the necessary works for drainage, &c.; decided objection to any further taxation in reference to Thames floods, 1561-1567.

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*Dines, George.* (Analysis of his Evidence).—Is a retired builder residing at Walton-on-Thames, 291.—Submits a Table showing the amount of rainfall in the London district as far as Oxford, from 1813 to the present time, 291-294.

*Dod, The Rev. C. Wotley.* (Analysis of his Evidence).—Experience of witness for several years as chairman of the sanitary authority of Eton, whilst he has been an assistant master at Eton College for some twenty-seven years, 1608-1611.—Information as to the number and extent of the floods, as experienced at Eton since 1852; belief that no sanitary evil results either to the town or the college, 1612-1619. 1631. 1640, 1641. 1679, 1680—

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*Donaldson, William.* (Analysis of his Evidence.)—Part taken by witness, as civil engineer, in carrying out the Reading main drainage works, 1575—Great difficulties involved in these works; particulars more especially as to the obstructions in the channel of the Kennet, and as to the flooding of the low-lying portion of the sewage farm, 1576-1599—Estimate of about 12,000 l. as sufficient to prevent the flooding of the sewage farm; very exceptional occasions however on which this land is liable to be flooded, 1586-1591. 1593-1597.

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*Islands.* Expediency of properly dredging the river and removing the islands, which at present greatly retard the flow of the floods, *Clutterbuck* 640—Undue obstruction caused by the eyots to the flow of the water, *Pullin* 1319, 1320. 1369—Powers required for removing the obstruction caused in the river by islands, *Sir P. Colquhoun* 1780—Limited obstruction caused by the aits, *Leach* 1976, 1977.



## J.

**JURISDICTION:**

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Further approval of dealing with the river by means of more than one authority; instances of rivers in Ireland in which the drainage is carried on under two bodies of conservators, *Hawkins* 461-464. 469, 470.

Suggestions as to the authorities to be charged with the jurisdiction of the river, *Harcourt* 540 *et seq.*—Expediency of there being one controlling authority such as the Board of Trade or the Inclosure Commission, and two executive authorities working under it for the upper river above Teddington, *ib.* 540-554—Suggested limitation of the action of the Conservancy to the river below Teddington, *ib.* 544.

Decided opinion that the jurisdiction of the Conservators should continue to extend to Cricklade; desirability, however, of having the navigation and the drainage under separate boards, *Clutterbuck* 626-648.

Grounds for the conclusion that, as a broad principle, the beginning of all useful dealings with the Thames is to extinguish altogether the rights of property and government of the Conservancy above Teddington Lock, *Neate* 674-678. 686-690—Suggestions for the formation of one general board, with local district drainage acting in subordination, *ib.* 689, 690. 692. 705.

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Objection to there being one jurisdiction over the whole river with two subordinate authorities; this system would be just as bad as the Conservancy, *Arkell* 855, 856—Grounds for the conclusion that the Drainage Commissioners should have exclusive jurisdiction above Long Wittenham, and a separate board be formed for the district below, *Wood* 873-886—Evidence in favour of a controlling government body, with two subsidiary boards, *ib.* 887-873. 919-929.

Proposal for dividing the river above Teddington, just below its junction with the Thames, so as to have two controlling bodies, the Conservancy to be in authority below Teddington, *Castle* 1006-1018—Opinion that these three independent bodies, with the Inclosure Commissioners as a court of appeal, would act harmoniously, and to the great advantage of the land, *ib.* 1019-1029—Approval of one board for the upper and lower Thames, with separate committees for different sections of the river, *Mackenzie* 1156-1160.

Opinion adverse to the Conservancy having charge of the drainage as well as the navigation of the upper river, *Leach* 2009-2013, 2020, 2021—Evidence in favour of one board exercising jurisdiction over the whole of the Thames area, with local or sub-boards for the tributaries, *Rawlinson* 2262-2265. 2271-2277.

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Proposition that the upper river and lower river be treated as one, the finances being amalgamated and there being no separation of accounts, *Nelson* 2711-2713—Statement as to the Corporation or Conservancy jurisdiction having always extended to Staines, *ib.* 2755-2758—Decided objection to separate boards for the upper and lower Thames, *Lord O. Fitzgerald* 2807.

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Evidence respecting proposals for the future government of the river, as made at a meeting of the Drainage Commissioners held on the 9th June, *Hawkins* 3245—Expediency

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diency of dividing the river into two parts, one to be governed by the Conservators, and the other to be under the jurisdiction of the Drainage Commissioners, *Hawkins* 3263-3267.

See also *Local Jurisdiction.*      *Thames Conservancy.*      *Thames Valley Drainage Commissioners.*      *Tributaries of the Thames.*

## K.

*Kempford.* Statement as to the land occupied by witness and his brother in Kempford parish being frequently flooded, *Arkell* 806-815.

*Kennet, The.* Considerable loss suffered by witness, as a miller, on account of the flooding of the Kennet; opinion that the health of his family is not affected injuriously by the floods, *Charlwood* 297-302—Statement that the excessive height of the floods in the valley of the Kennet is attributable to the natural obstructions in the river; definition of these obstructions, *ib.* 303-319. 330.

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Injury caused to property at and near Reading by overflows of the Kennet, *Hood* 1538-1546; *Day* 1558-1563; *Donaldson* 1591, 1592. 1605, 1606—Jurisdiction of the Conservancy over part of the Kennet, *Day* 1570, 1571.

*Kingston.* Witness, who has been town clerk of Kingston for fifteen years, testifies to the great damage done to the low lying parts of the town when very high floods occur, *Wilkinson* 1728-1733—The injury to Kingston would be greatly aggravated by the measures proposed for relieving the upper Thames by bringing down the flood waters more rapidly, as by the opening of locks and weirs, *ib.* 1735, 1736. 1745. 1762-1767.

Exceptional occurrence of very high floods, Kingston not being willing to incur any great outlay for protection, *Wilkinson* 1740, 1741—Objection to embankment works at Kingston, *ib.* 1756—Steps being taken for the adoption of a drainage scheme for Kingston, the drainage now going into the Thames, *ib.* 1757-1761.

Conclusion that there need be no fear of flooding at Kingston when the improvements at and below Teddington Lock are in operation, *Leach* 2837, 2838.

See also *Teddington.*      *Upper River.*

## L.

**LANDOWNERS:**

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Anxiety of the landowners in the district of the upper Thames to be allowed to manage their own affairs, *Harcourt* 524; *Arkell* 848, 849—Willingness of the landowners to be taxed in reference to floods, if it be done fairly, for benefits received, *Harcourt* 524.

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Belief that though land does not let for less in consequence of the injury done by the action of the Conservators, it would have let for more had improvement by irrigation continued, *Wood* 936, 937—There is no real conflict of interest between the landowners and the navigation interests, *ib.* 938, 939.

Belief that landowners would not object to being fairly rated distinctly for the benefit  
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of the land by the boards proposed; that is, on certain conditions as to tolls, &c., *Castle* 1032-1039—Willingness of the riparian agricultural interests to be rated for the prevention of floods; that is, if they are duly represented in the management, *Sir P. Colquhoun* 1788-1791. 1798.

Contemplated rating of the landowners for the proposed embankments, *Rawlinson* 2236-2239—Decided objection to the riparian owners being rated for the construction of an embankment on a large scale, *Sir G. East* 2354, 2355. 2361-2364. 2386-2387.

Opposition on the part of the riparian owners, but for which a certain scheme of works near Oxford would have been carried out; the objection applied not to the works, but to the proposed rating powers in the Conservators, *Sir F. Nicolson* 2522-2526.

Willingness of witness to be rated in proportion to the benefit derived from the exclusion of floods; very little damage, however, between 1852 and 1876, *Vansittart* 2578. 2581-2587—Opinion that the required funds should be raised by a tax on the riparian owners, *Etheridge* 2621-2623—Non-objection to the riparian owners being rated, if any rate be necessary after an increased payment by the water companies, *Lord O. Fitzgerald* 2795.

Consideration of the question as to the riparian interests in the upper river being really opposed to the control of the Conservancy Board; statement hereon as to the relative interests represented by the Drainage Commissioners and by the Board, *Sir F. Nicolson* 2907-2911. 2994-3001. 3003-3005.

Strong feeling among the riparian owners round Oxford against the jurisdiction of the Thames Conservancy; desire of the landowners to be allowed to manage their own affairs, *Hawkins* 3259-3267.

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*Leach, Stephen William.* (Analysis of his Evidence.)—Has been engineer to the Thames Conservancy for upwards of thirty-five years, 1875, 1876—In conjunction with the late Mr. Beardmore, made a thorough examination of the river after the Conservancy Act of 1866; joint report then made, setting forth the works required in reference to navigation, prevention of floods, &c., 1877-1879. 1882-1884.

Belief that floods in the Thames Valley, though not preventible, may be greatly mitigated, 1880, 1881. 1893, 1894—Steps taken since 1866 in lowering several locks so as to facilitate dredging and the escape of flood-water, 1884-1888—Want of funds, but for which dredging and other improvements would have been carried out on a much larger scale in the upper river, 1187-1899. 1901, 1902. 1909-1912. 2083.

Very small and temporary relief in great floods by increased facilities for opening the locks and weirs in anticipation of floods; grounds for this conclusion, 1900. 2023-2040. 2044-2046. 2108-2113—Very inadequate relief to be given by means of impounding reservoirs, whilst the cost would be great, 1903-1908—Considerable improvement effected by the Conservators in the condition of the locks, 1909—Large outlay also in the repair and renewal of weirs, whilst two new ones have been built, 1909-1912.

Absence of control in the Conservators over the bridges on the upper Thames, 1913—Comment upon the obstructive character of old Maidenhead Bridge, 1914-1917—Summary of the steps taken by the Conservators for enforcing the exclusion of sewage from the upper river, and for otherwise purifying the water; action of the local authorities in this respect, 1918-1921—Ill-feeling against the Conservators on account of their action in enforcing the purification of the river, 1921, 1922.

Very little traffic in the upper Thames; limited outlay by the Conservators on this part of the river, 1923—Comment upon the inaction of the Thames Valley Drainage Commissioners; great delay on their part in carrying out the required works, 1923-1925. 1933—Opinion as to the unfairness of charging upon the land all the cost of the necessary flood works, 1926—Comparatively small annual charge for which the colleges in Oxford might be relieved from the ill-effects of floods, 1926-1929.

Tolerably good state of the locks between Oxford and Lechlade, though this can hardly be said of the weirs, the original construction of these having been very faulty, 1930-1935—Less satisfactory state of the navigation of the upper river than in former years, 1935-1938—Disapproval of a canal from Abingdon to Ridges Weir, 1939-1941.

Statement showing that below Staines and below Teddington dredging has been carried out on a large and costly scale; great improvement by the dredging below Teddington, 1942-1946—Expenditure of some 10,000 *l.* in rebuilding Teddington Weir; excellent facilities in the new weir for the escape of flood-water, 1946-1948—Explanation of the instructions and arrangements as to the lock-keepers telegraphing to the Conservancy Board any defect in the locks or gear, and taking action upon the occurrence of floods, 1949-1962. 2032.

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*Leach, Stephen William.* (Analysis of his Evidence)—continued.

Advocacy of the extension of tumbling bays as the best or only means of mitigating floods in the Upper Thames; necessity at the same time of removing shoals and other obstructions, 1962-1980. 1999-2022.

Works proposed for the relief of Staines; several flood channels proposed between Staines and Teddington, 1981-1986. 2152-2154. 2157, 2158—Side cut proposed at Teddington Lock; relief thereby to Kingston, 1985-1988. 1992, 1993—Estimate of 63,000 £. as the cost of the proposed works between Staines and Teddington; contemplated assessment of the cost upon the parishes abutting on the river, a rate of 5 *d.* in the pound being sufficient, 1988-1998. 2122-2125—Means suggested for obviating the obstruction caused by Sandford Weir, 2000-2002.

Conclusion as to the entire sufficiency of one board for dealing with the river from Yantlet Creek up to its source, 2003-2005—Objection to the Conservators having increased jurisdiction over the tributaries, 2005-2007. 2078-2082. 2126-2129—Excessive surprise of witness on hearing that an unfriendly feeling existed between the Conservators and the Drainage Commissioners; ready facilities granted by the former for the inspection of their plans and sections by the latter, 2008-2013.

Opinion adverse to the Conservancy having charge of the drainage as well as the navigation of the upper river, 2009-2013. 2020, 2021—Necessity of the Conservators having some control over the supply of water in the upper river, 2012. 2103-2107—Doubt as to the necessity of the riparian parishes, though taxed for the works, being represented in the Conservancy, 2014-2016—Importance further attached to a sufficient outlet at Teddington, 2023-2030.

Further evidence in support of the system of tumbling bays, and in consideration of objections thereto, 2041-2045. 2058—Instances of mill-heads and sills having been unduly raised in former years; difficulty in proving this, 2047-2052—Facility doubtless in proving whether sufficient waterway is provided at mills, 2053-2056—Extent to which there is control over millers as regards their shutting of the flood-gates; limited effect in any case as regards floods, 2058-2064. 2114-2121. 2145. 2149, 2150. 2161, 2162—Approval of increased control over the millers on the tributaries, 2064, 2065.

Explanation with reference to the effect produced by the bursting of portion of the bank at Teddington Lock, 2066-2072—Material reduction in the height of floods at Staines by increased dredging lower down, 2074, 2075—Less probability of the water rising by percolation if the bed of the river be lowered by dredging, 2076, 2077.

Necessary separation between the funds available for the upper river and those available for the lower; assistance derived by the former from the latter, 2084-2086—Total of about 4,000 £. a year derived from tolls on the river above Staines, including pleasure traffic, 2067, 2088.

Explanations with further reference to the scheme proposed by Mr. Beardmore and witness in 1868 for lowering the level of the river at Oxford, 2089-2102. 2151. 2155, 2156. 2163-2165—Beneficial effect of the improvement proposed in the Thames at Oxford in respect of floods in the Cherwell, 2127-2134.

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Effect of the locks in raising to some extent the ordinary level of the river, 2177-2179—Height, at Lechlade, of 224 feet above Trinity high-water mark, 2180. 2181—Difference of not more than ten feet, in many cases, between low-water and high-water mark, 2182-2184.

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[Fourth Examination.] Admission that the high-water mark at Ifley Weir has been shifted  
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shifted from one side of the lock to the other; decided statement that it was put precisely at the same height that it was before, 3738-3743. 3755. 3756. 3776-3778. 3789-3793 — Denial that the height of the weir has been raised by means of timber placed on the top of the sill, to the extent of fourteen inches; assertion that no work beyond ordinary repairs has been done at this weir, 3744-3747. 3795-3817. 3825-3832.

Approval of the Thames Conservancy having control over the management of the weirs on the tributaries as well as on the main river, 3746, 3747. 3833-3843 — Grounds for the conclusion that previous to 1866 the water at Iffley had not been kept up to its proper height, 3748-3754. 3779-3781.

Character of the supervision exercised by the Conservancy over the lock-men in their employment, 3757-3772 — Explanation as to the course adopted by the Conservators on receiving Captain Owen's complaint as to the raising of the sill at Iffley Weir; unsuccessful attempts made more than once by witness to obtain an interview with Captain Owen, 3772-3775. 3844-3863 — Impossibility for the Conservators to lower the high-water mark at Iffley so as to protect the meadows without incurring complaints from the millers, 3782-3788.

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Estimate that the cost of a cutting at Teddington would be about 4,000 £; opinion that this operation would be most important in mitigating floods, 3864, 3865.

*Lechlade.* No steps taken as yet by the Drainage Commissioners to modify the floods in witness' district; preliminary steps for executing works on the river Cole now being taken by the district board, *Ellett* 769 — Neglect of the river by the Conservancy, and consequent injury to property at Lechlade, *Arkell* 816-819 — Works contemplated by the Lechlade District Board; views of witness thereon, *ib.* 824 *et seq.* — Proposal for a flood-bank, *ib.* 827.

No works done as yet by the Drainage Commissioners in the district between Lechlade and Newbridge, *Wood* 869-872 — Details of the works done by the Conservators in witness' district, and the consequent injury to property and navigation, *ib.* 904-918. 930-935. 970-984. 992 — Evidence to the effect that even in dry weather there is sufficient water for irrigation in witness' district, *ib.* 985-991.

Tolerably good state of the locks between Oxford and Lechlade, though this can hardly be said of the weirs, the original construction of these having been very faulty, *Leach* 1930-1935 — Height, at Lechlade, of 224 feet above Trinity high-water mark, *ib.* 2180, 2181.

*Level of the River.* Difference of not more than ten feet in many cases between low-water and high-water mark, *Leach* 2182-2184 — Duty of witness, as superintendent under the Thames Conservancy, to see that the water is kept up to the level of high-water mark, *Etheridge* 2641, 2642 — See also *Dredging.* *Locks.* *Weirs.*

*Linoleum Manufacturing Company.* Willingness of witness to part with the water rights of his company for a very small amount of compensation conditionally upon getting rid of the floods, *Taylor* 153-165.

*Loans.* Suggestion that the money necessary for the works might be raised by a loan from the Government, and paid off by a sinking fund, *Taylor* 86, 87. 135, 136.

Desirability of a recommendation from the present Committee that the Public Works Loan Commissioners should advance money for the purpose of the necessary drainage works, *Hawkins* 452-457 — General approval of the system in Ireland of advancing public money for drainage works; suggestion that such a system might be suitable in the present case, *ib.* 453-457. 493-496 — Suggestion that the Government should grant a loan at an easy rate of interest for the purpose of carrying out the work of improving the river, *Harcourt* 524-526.

*Local Government Board.* Grounds for the suggestion that any legislation necessary to give effect to the recommendations of the Committee be initiated and carried through by the Local Government Board, *Rep.* vii.

*Local Jurisdiction.* Doubt whether the local bodies would have abdicated their right to manage their own river, had they known that 5,000 £. or 6,000 £. would be given towards keeping it in order, *Neate* 716 — Suggestion that the riparian owners and mill-owners in the reach from one lock to another should act together as a sort of local authority, so as to secure a sufficient outlet for the water at the lower flood-lock upon the reach, *Saker* 1860-1863. 1867-1870.

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**LOCKS :**

LOCKS:

1. *Condition of the Locks, and Effect as regards Floods.*
2. *Question of increased Facilities for opening the Locks in anticipation of Floods.*
3. *Lock-keepers.*
4. *Number of Locks.*

1. *Condition of the Locks, and Effect as regards Floods:*

Bad state of repair of some of the locks, so that the flood-water cannot freely pass, *Mackenzie* 1169, 1170—Great damage done through the locks not being in perfect repair, *ib.* 1173-1175.

Operation of the locks and weirs as at present constructed, in diminishing the sectional area of the river, and in obstructing the flow of the flood-water; amended arrangements desirable in these and other respects, *Darvill* 1429-1433. 1469. 1497—Additional obstruction by the addition of five new locks several years ago, *ib.* 1439, 1440. 1516-1518.

Grounds for the opinion that in very high floods the locks and weirs generally have a very inappreciable effect, *Dod* 1647. 1654-1657. 1667-1669—Additional flow for the water by means of the lock-cuts; also where watercourses are provided at locks, *ib.* 1652, 1653. 1658-1662—Doubt as to locks having any ill-effect in time of floods, *Sir P. Colquhoun* 1783—Decided insufficiency of many of the flood-locks; large relief to be given by increased outlets, *Saker* 1873.

Steps taken since 1866 in lowering several locks so as to facilitate dredging, and the escape of flood-water, *Leach* 1884-1888—Considerable improvement effected by the Conservators in the condition of the locks, *ib.* 1909—Effect of the locks in raising to some extent the ordinary level of the river, *ib.* 2177-2179.

Restoration of Hambledon and Marlow Locks whilst other locks will doubtless be improved in time, *Sir G. East* 2370-2379—Great improvement effected in the locks, *Lord Otho Fitzgerald* 2782.

Denial that at any of the locks the sills of the weirs have been raised, with the exception of Temple Lock, and that was done solely with the object of preserving the original level, *Leach* 3269-3280.

2. *Question of increased Facilities for opening the Locks in anticipation of Floods:*

Argument in favour of opening the sluices of the locks in anticipation of floods; letter from the secretary to the Thames Conservancy upon this subject, *Taylor* 20-31. 58. 115-121. 124-126—Great importance of telegraphic communication from lock to lock in anticipation of floods; belief that an improved supervision of the locks would mitigate the floods very much, *ib.* 58-63. 112—Absence of necessity for adopting a system of telegraphic communication as to the existence of floods in different parts of the river, *Clutterbuck* 599. 624, 625. 639.

Advantage if the locks were under the control of the millowners, as being specially interested in the prevention of floods, *Saker* 1199, 1200—Opinion that opening the locks is the best protection against floods; difficulty as regards the mills, *Woodbridge* 1244-1246.

Importance of the locks being provided with self-acting gates; instance of flooding through neglect to open the lock-gates, *Pullin* 1319-1324. 1339-1354—Great improvement doubtless, if when floods are coming telegraphic instructions were given from London for the opening of the locks and sluices up the river, *ib.* 1367-1369—Great want of proper facilities for opening the locks and weirs in time of floods, *Darvill* 1429-1433. 1497.

Opinion that it would be little, if any use, to lower the water in the locks when floods are about to come down the river, *Dod* 1667-1669.

Belief that floods might be greatly reduced if the lock-keepers were instructed by a central authority by telegraph to draw the weirs in time; remissness at present in this respect, *Mills* 1694-1711. 1717-1727—Approval of arrangements whereby in early anticipation of floods the locks and weirs might be better regulated; that is, so that the river generally might be lowered, *Wilkinson* 1736-1738. 1743-1749. 1766, 1767—Considerable relief by opening flood-gates sufficiently early, and by having self-regulating weirs and sluices, *Tower* 1771, 1772.

Very small and temporary relief in great floods by increased facilities for opening the locks and weirs in anticipation of floods; grounds for this conclusion, *Leach* 1900. 2023-2040. 2044-2046. 2108-2113—Explanation of the instructions and arrangements as to the lock-keepers telegraphing to the Conservancy Board any defect in the locks or gear, and taking action upon the occurrence of floods, *ib.* 1949-1962. 2032.

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Advantage if, when floods are expected, all the gates at all the locks were opened, *Wethend* 2603, 2604—Due vigilance exercised by the lock-keepers in drawing the water in anticipation of floods, *Etheridge* 2642-2645.

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*Ludlow, William.* (Analysis of his Evidence.)—Is an occupier of land at Iffley, 3581, 3582—Information respecting the late alteration in height of the lasher at Iffley; alteration by the Thames Conservancy of the high-water mark, 3583-3587. 3601—Statement that this alteration has been made for the purposes of navigation, 3588-3598—Considerable damage inflicted upon witness' property by reason of the overflow of the river, 3599, 3600.

## M.

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2. *Question of amended Regulations or increased Control on the part of the Thames Conservancy.*

1. *Degree of Obstruction caused in the River by Mills, and the action of the Millers:*

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**THAMES CONSERVANCY:**

1. *As to the Constitution of the Conservancy Board; Question of a fuller Representation of the Upper River.*
2. *As to the Jurisdiction of the Board.*
3. *Action of the Board in reference to Floods, &c.*
4. *Relations with the Thames Valley Drainage Commissioners.*
5. *Meetings of the Board; Payment for Attendances.*
6. *Circumstances connected with the passing of the Act of 1866.*

1. *As to the Constitution of the Conservancy Board; Question of a fuller Representation of the Upper River :*

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Amount of tolls collected at the several locks from Lechlade to, and including, Day's Lock, in each of the years 1867–76; total of 11,149 *l.*, *App.* 214.

Decrease in the proceeds of the tolls from 14,000 *l.* in 1843 to 3,000 *l.* in 1865; that is, through the diversion of traffic by the railways, *Rep.* iii—Decreased traffic and tolls between Staines and Oxford, notwithstanding the improved navigation works carried out by the Conservators, *ib.* iv—Total of only 3,909 *l.* received from navigation tolls between Cricklade and Staines in the year 1876, *ib.* vi.

*See also Pleasure Boats. Revenue and Expenditure. Steamers.*

**Tower, Christopher.** (Analysis of his Evidence.)—Large interests of witness as a land-owner in a certain district in the valley of the Colne; explanation as to the steps taken by him for preventing floods in this district, and as to the successful effects thereof, 1768–1771—Reference to the large number of mills on the river, 1768, 1778, 1779—Continued liability to floods in the Colne, below the Great Western Railway at Drayton; means by which these might be prevented, 1770–1773. 1778—Importance of co-operation between mill-owners and land-owners, 1770. 1772.

Considerable relief by opening flood gates sufficiently early, and by having self-regulating weirs and sluices, 1771, 1772—Expediency of central control and constant surveillance over the Colne, with a view to the prevention of floods, 1772, 1773. 1777, 1778—Approval of the Thames Conservators having jurisdiction over the whole valley of the Colne, with a view to the removal of obstructions in the river, 1774–1778—Great improvement if there were power to straighten the course of the Colne in some places, 1778.

**Towle, John.** (Analysis of his Evidence.)—Is a magistrate for Oxford, and a member of the town council, 717, 718—Selfishness of the city in its objection to being rated for needful works, 719—Examination as to the mills question, in which witness is largely interested, 719–743—Evidence as to the head of Sandford Mill having been raised, and as to the consequent injury to navigation, 719–735—Advisability of the Weirs mill being removed; price at which witness would sell this mill, 736–743—Statement as to the upper river having been navigated by a Mr. Wyatt, with the “Brimstone,” a boat of 150 tons, 744–748.

**Towns.** Opinion that there should be compulsory powers to obtain contributions from towns as well as from lands towards the required drainage works; reason for not making this proposal when the Act of 1871 was obtained, *Hawkins* 458–461—Expediency of the towns in the neighbourhood of the river being rated, on account of the benefit which they would receive from the proposed works, *Harcourt* 527, 528.

Proposal that the mayor of every riparian town from Staines Stone to Oxford should be a member of the proposed new Board; question hereon whether the chairman of each local board or some member of the corporation would not be a better and more permanent representative, *Darvill* 1471, 1472. 1528–1535.

**Tributaries of the Thames.** Powers of the Drainage Commissioners, but not of the Conservators, in regard to the tributaries; explanation of the delay in the exercise of such powers, *Dean of Christchurch* 210, 211. 254–261—Mischiefs arising from branch streams or tributaries, which witness suggests should be under the authority of the  
Drainage

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*Tributaries of the Thames*—continued.

Drainage Commissioners; belief that no difficulty would arise in dealing with private rights, *Castle* 1004-1007, 1010, 1034-1036, 1066-1070.

Objection to the Conservators having increased jurisdiction over the tributaries, *Leach* 2005-2007, 2078-2082, 2126-2129—Approval of increased control over the millers on the tributaries, *ib.* 2064, 2065—Powers under the Public Health Act and Rivers Pollution Act for compelling local authorities to perform their duties in reference to the condition of tributary streams, *Rawlinson* 2273-2277—Doubt as to the expediency of the Conservancy having fuller jurisdiction over the tributaries, *Sir F. Nicolson* 3039, 3040, 3061-3063, 3081, 3082.

Estimate of 42,500 £ as the cost of works proposed by witness' firm for the tributaries, *Falkiner* 3113.

Approval of the Thames Conservancy having control over the management of the weirs on the tributaries as well as on the main river, though such control would be more for the benefit of the localities than for the main river, *Leach* 3746, 3747, 3833-3843.

Conclusion of the Committee that it is essential that whatever body has authority over the Thames for the prevention of floods, &c., should also have control over the tributaries for the same purposes over such distances as the circumstances may require, *Rep.* vi.

See also *Cherwell, The. Colne, The. Jurisdiction. Kennet, The.*

*Tug-boat.* Considerable and excessive charge for the steam-tug of the Conservators, *Taunton* 3623.

Occasional employment of the tug-boat above Abingdon in towing empty boats up to the Oxford canal in flood time, *App.* 213—Proportionate benefit to the river above Abingdon from the outlay on the tug and on plant, *ib.*

Statement of expenditure in purchase of plant, steam-tug, &c., *App.* 216.

*Tumbling Bays.* Advocacy of the extension of tumbling bays as the best or only means of mitigating floods in the upper Thames; necessity, at the same time, of removing shoals and other obstructions, *Leach* 1962-1980, 1999-2022—Further evidence in support of the system of tumbling bays, and in consideration of objections thereto, *ib.* 2041-2045, 2058.

Advantage of the tumbling bays in times of flood; suggestions for their improvement by the application of sluices, to be opened when the floods are excessive, *Lord Otho Fitzgerald* 2776-2779, 2789, 2796, 2797—Objection to tumbling bays in the upper river, *Falkiner* 3120.

## U.

*Upper Cookham Weir.* Comment upon the omission to open the gates in the Upper Cookham Weir during the last great flood; representation made by witness on the subject to his landlord, who is one of the Thames Conservators, *Mills* 1699-1711.

## UPPER RIVER:

Complaint as to the action of the Conservators in reference to the upper river, *Dean of Christchurch* 196 *et seq.*; *Neate* 656, 667; *Taunton* 3701—Belief that the proper solution of the difficulties respecting the weirs in the upper river will be a transference of the upper river to the Drainage Commissioners, *Hawkins* 466.

Decided opinion that any works carried on by the Drainage Commissioners on the upper part of the river would not be detrimental to the lower part; contention, on the other hand, that the lower river would be benefited by the works, *Hawkins* 470-472.

Statement that the Thames Conservancy has carried out no improvements between Lechlade and Oxford which in any way affect the landowners; the Conservators, in buying up the old weirs, only make matters worse, *Harcourt* 518-520.

Information as to the works which have been carried out by the Conservancy between Lechlade and Oxford, *Clutterbuck* 575-582—Tendency of works for the relief of the upper districts to increase the floods in the lower districts, *Sir J. Hawkshaw* 1844—Limited outlay on the upper Thames, *Leach* 1923—Tolerably good state of the locks, but not of the weirs, between Lechlade and Oxford, *ib.* 1930-1935.

Important improvements effected in the upper Thames by the Conservancy Board; satisfaction given by the Board in witness' district, *Sir G. East* 2357, 2365-2379—Action of the Board in the interests alike of the upper and the lower river, *Sir F. Nicolson* 2500—Circumstance of the staff of the Board being now available for the upper as well as the lower river, *ib.* 2508.

Satisfactory and harmonious action of the Thames Conservancy in the upper river as regards floods, *Vansittart* 2574, 2587, 2588—Testimony to the excellent services rendered by the Conservators (with the very inadequate means at their disposal) in the upper river, *Wethered* 2606, 2607—Great improvement effected in the state of the river, and in the locks and weirs in the district from Staines to Cricklade during the last



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last ten years, though much has been left undone through want of funds, *Etheridge* 2618-2620. 2625.

Great improvement effected by the Thames Conservancy in the upper river, *Nelson* 2704—Suggestion that the upper river and lower river be treated as one, financially and otherwise, *ib.* 2711-2713—Intimate experience of witness as to the condition of the Thames since 1863; great improvement in the river up to Oxford under the jurisdiction of the Conservancy Board, *Lord O. Fitzgerald* 2773-2776. 2780-2783.

Reference to some complaints on the part of the Thames and Severn Canal Company as to the bad state of the upper river; admission that improvement is much required, the want of funds being the difficulty, *Sir F. Nicolson* 3020-3025. 3083-3086.

Reference to certain old reports in 1789, 1791, and 1802, as showing the state of the upper river as to locks and weirs in former times; very little done to the works above Oxford since the latter year, *Falkiner* 3123, 3124. 3150-3165—Suggestion as to the Thames Conservancy paying 11,000 *l.* towards improvements between Oxford and Day's Lock, *ib.* 3192, 3193.

Limited powers of the Conservancy in dealing with the upper river, save for navigation purposes, *Rep.* iv—Circumstance of there being no authority below Long Wittenham with special powers for the prevention of floods, or for arterial drainage, *ib.* v.

Conclusion of the Committee that for the purpose of drainage and the prevention of floods below Long Wittenham the proper course would be for riparian owners and occupiers to unite and obtain powers to establish an arterial drainage authority, *Rep.* v—Suggestion that the duties in question might be advantageously delegated to the Conservancy, an adequate representation of riparian interests being provided on the Board, *ib.*—Paramount importance of the control of floods on the upper river, *ib.* vi.

See also *Dredging.* *Kingston.* *Landowners.* *Lechlade.* *Locks.*  
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*dence.* *Thames Commissioners.* *Thames Conservancy.* *Thames and Severn*  
*Canal Tolls.*

## V.

*Vansittart, George Henry.* (Analysis of his Evidence.)—Interest of witness as owner of land adjoining the river above and below Marlow, some of this land being liable to floods; benefit thereby to the grass land but not to the arable, 2567-2572. 2581-2584—Disapproval of embankments as a means of preventing floods, 2570—Satisfactory and harmonious action of the Thames Conservancy in the upper river as regards floods, 2574. 2587, 2588.

Value attached to a suggestion for placing boards in the weirs in summer, so as to raise the level of the water, whilst they should be removed in winter, 2575, 2576—Expediency of dredging the river, rather than of making canals or cuts; heavy cost entailed by the latter works, 2577. 2590—Willingness of witness to be rated in proportion to the benefit derived from the exclusion of floods; very little damage, however, between 1852 and 1876; 2578. 2581-2587—Limited obstruction caused by Henley Bridge, 2578, 2579.

Impracticability of entirely guarding against such exceptional floods as those of 1852 and 1876; 2578—Great obstruction caused by Maidenhead Bridge and other bridges, 2580—Probable instances of remissness on the part of lock-keepers, 2589—Facility of greatly mitigating floods if funds were available for carrying out the arrangements of the Conservancy, 2590.

## W.

**WATER COMPANIES:**

Grounds for the conclusion that the revenue which the Conservators draw from the water-companies should be expended upon improvements on the upper Thames, *Taylor* 82-86—Decided opinion that the amount contributed by the water companies for the purification of the Thames should be credited to the upper part of the river, *Dean of Christchurch* 203, 204.

Argument in favour of the Drainage Commissioners receiving part of the money contributed by the water companies for the purification of the water which comes from the upper valley, *Hawkins* 469—Opinion that the contribution by the water companies might fairly be raised, *ib.* 2142-2144.

Comment upon the limited contribution accepted from the water companies in return for their supplies taken from the Thames; proposal made by witness at the time that the contribution should be 20,000 *l.*, *Rawlinson* 2226-2231—Payments made by the companies adverted to as not being in consideration of the exclusion of sewage from the river by the towns on the upper Thames; condition as to the river being better scavenged by the Conservancy Board, *ib.* 2255-2261. 2297-2302.

Examination

**WATER COMPANIES**—continued.

Examination as to witness' reasons for the conclusion that the water companies should pay a much larger contribution to the funds of the Thames Conservancy; witness does not, however, contend that the water is the property of the Conservancy, *Rawlinson* 2297-2307. 2321-2323. 2334-2341.

Evidence in support of the conclusion that the water companies should be required to make a considerable increase to their present contributions to the Thames Conservancy; suggested additional contribution of 5,000 *l.* a year, *Sir F. Nicolson* 2432-2462. 2527-2534—Total of 6,550 *l.* a year now contributed by the water companies to the upper river fund, and of 1,450 *l.* to the lower fund, *ib.* 2433-2440—Approval of the water companies being represented if they pay an increased contribution, *ib.* 2513-2519—Inference as to the water companies being satisfied with the action of the Conservators, *ib.* 2549.

Decided opinion that the water companies should pay a much larger contribution, *Lord O. Fitzgerald* 2787-2789. 2795—Explanation of an apparent discrepancy in the accounts as to the receipts from the water companies, *Sir F. Nicolson* 2855-2862.

Large supply abstracted by the companies, though yet within the prescribed limit; improvement if the contributions were assessed upon the actual quantity taken, *Sir F. Nicolson* 2863-2868. 3033, 3034. 3042-3049. 3095-3100—Conclusion that an increased payment by the companies is the best and most equitable means of providing increased funds for the improvement of the river, *ib.* 2864-2866. 2901, 2902. 3035, 3036. 3090-3094.

Total of 8,000 *l.* a year now paid by the water companies taking supplies from the Thames, *Rep.* v—Payment of 6,450 *l.* a year by five companies, under agreement in 1852 and under Act in 1866, *ib.*—Benefits received by the water companies in return for which the rents are paid, *ib.*

Conclusion of the Committee that the rents might in fairness be increased; increase of revenue of the companies adverted to hereon, *Rep.* v, vi—If the rents be increased it might be desirable to give the companies some representation on the Conservancy Board, *ib.* vi.

Opinion that a further sum of 6,250 *l.* a year should be paid by the five original contributory companies, making a total of 14,250 *l.* a year, *Rep.* vi.

Recommendation, also, that a sum of 5,550 *l.* a year out of 14,250 *l.* to be paid by the water companies, be applied to works for prevention of floods, purification of water, and dredging or improvement of the reaches, with a view to the summer water supply, *Rep.* vi—Suggestions as to the division of the sum of 5,550 *l.* a year between different parts of the river, *ib.*

**Water Supply.** Belief that the present system of water supply to London will eventually be done away with, and the water for the supply of the metropolis obtained from Wells, *Taylor* 186—Geological character of the water-shed of the Thames valley; belief that the river contains sufficient water for the supply of London without being obliged to have recourse to storage, *Clutterbuck* 606, 607.

Necessity of the Conservators having some control over the supply of water in the upper river, *Leach* 2012. 2103-2107—Improvement in the water supply of London by embanking the valleys on the upper Thames and impounding the spring water, *Rawlinson* 2329-2333.

Very prejudicial effect upon the navigation in summer through the increasing abstraction of water by the London companies, *Nelson* 2735. 2750, 2751.

See also *Impounding Reservoirs.* *Sewage.*

**Weeds.** Statement that the weeds in the river have not caused any mischief of late years, *Clutterbuck* 607—Neglect in the matter of weeds, *Wood* 913—Mitigation of mischief by the removal of weeds, *Pullin* 1376.

Effectual steps taken by the Thames Conservators for the removal of weeds, *Leach* 1898. 1975—Explanation as to weeds having, under different conditions, a purifying or a polluting effect upon the water, *Rawlinson* 2311-2314—New regulation about to be enforced as regards the removal of weeds, *Sir F. Nicolson* 3037.

**WEIRS:**

Certain weirs unwisely abolished by the Thames Conservancy; very pressing want of the locks and weirs being rendered efficient to assist the running off of water, *Castle* 1084. 1100-1102—Description of some weirs removed by the Conservators, which were roughly constructed entirely of wood, and the property of private individuals, *Wood* 1124-1132—Increase of floods owing to the height at which the weirs are kept, *Mackenzie* 1144, 1145.

Prevention of floods by providing proper facilities for emptying each reach of the river into the reach below, *Saker* 1185-1189—Grounds for the opinion that the back-

**WEIRS**—continued.

ing up of the water by weirs makes very little difference in a large flood, *Dod* 1647. 1667. 1667-1669—Decided obstruction caused by weirs; suggestions for their improvement, *Sir P. Colquhoun* 1784-1787.

Effect produced by weirs and other obstructions in the channel of the river, *Sir J. Hawkshaw* 1809-1811. 1826, 1827—Means of constructing weirs so that in flood times they may be converted into sluices and not obstruct the waterway, *ib.* 1827. 1853.

Large outlay in the repair and renewal of weirs, whilst two new ones have been built, *Leach* 1909-1912—Primitive and faulty construction of the weirs between Oxford and Lechlade, *ib.* 1930-1935.

Grounds for the conclusion that weirs have no appreciable effect upon great floods, and that tumbling bays would be useful only in small or ordinary floods, *Rawlinson* 2195-2202. 2204-2207—Further evidence as to the entire inadequacy of a re-arrangement or removal of weirs as a remedy in times of great floods, *ib.* 2243-2246. 2308-2310. 2325-2327.

Very dilapidated character of some weirs removed above Oxford, *Sir F. Nicolson* 2541, 2542—Inaccuracy of a statement as to the sills of some of the weirs having been raised, *ib.* 2546-2548.

Value attached to a suggestion for placing boards in the weirs in summer, so as to raise the level of the water, whilst they should be removed in winter, *Vansittart* 2575, 2576—Increased precaution desirable in drawing the flood-gates in weirs, *Wethered* 2603, 2604. 2608, 2609.

Doubt as to the pulling down of several old weirs having injured the navigation; probability of some dredging having been carried out at the same time, *Etheridge* 2678-2689—Primitive character of the weirs above Oxford; great delay in getting through them, *Nelson* 2723, 2724. 2746-2749.

Explanation that is proposed by witness to re-instate two weirs that have fallen into decay, *Falkiner* 3111. 3185-3187—Importance of increasing the area of the weirs; objection to fixed weirs, *ib.* 3119, 3120. 3149.

Belief that all, and certain knowledge that three, of the weirs between Oxford and Iffley have been raised, *Owen* 3421-3423—Great injury caused to the navigation by the removal of eight weirs by the Conservators, which has lowered the level of the water, *Taunton* 3663, 3664—Explanation that pounded water is more suitable for the carriage of flood-water than that which is not pounded; statistics in support of this argument, *ib.* 3714-3717. 3720-3726.

Expediency of the prompt opening of weirs and flood-gates in the event of floods, *Rep vi.*

<i>See also Abingdon Weir.</i>	<i>Bell Weir.</i>	<i>Boulter's Weir.</i>	<i>Iffley.</i>	<i>Locks.</i>
<i>Medley Weir.</i>	<i>Mills.</i>	<i>Navigation.</i>	<i>Sandford Lock and Weir.</i>	<i>Sluices.</i>
<i>Teddington.</i>	<i>Tumbling Bays.</i>	<i>Upper Cookham Weir.</i>	<i>Upper River</i>	
<i>Works.</i>				

**Weirs Mill.** Advisability of the Weirs Mill being removed; price at which witness would sell this mill, *Towle* 736-743.

**Wethered, The Rev. Florence Thomas.** (Analysis of his Evidence.)—As Vicar of Hurley, testifies to the frequent flooding of lands and houses in the parish, and to the bad sanitary effects thereof; doubt, moreover, as to meadow lands being really benefited, 2591-2600—Want of increased control in the Conservators over mills and mill-sluices, 2603—Advantage if, when floods are expected, all the gates at all the locks were opened, 2603, 2604—Increased precaution desirable in drawing the flood-gates in weirs, 2603, 2604. 2608, 2609.

Testimony to the excellent services rendered by the Conservators (with the very inadequate means at their disposal) in the upper river, 2606, 2607—Deprecation of any undue interference with the Conservancy as at present constituted, 2606.

**Wilkinson, Walter.** (Analysis of his Evidence.)—Has been Town Clerk of Kingston for fifteen years; testifies to the great damage done to the low-lying parts of the town when very high floods occur, 1728-1733—Submits that the injury to Kingston would be greatly aggravated by the measures proposed for relieving the upper Thames by bringing down the flood-waters more rapidly, as by the opening of locks and weirs, 1735, 1736. 1745. 1762-1767.

Approval of arrangements whereby in early anticipation of floods the locks and weirs might be better regulated; that is, so that the river generally might be lowered, 1736-1738. 1743-1749. 1766. 1767—Exceptional occurrence of very high floods, Kingston not being willing to incur any great outlay for protection, 1740, 1741—Expediency of the riparian interests, if taxed, being represented in the management, 1742.

Relief

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*Wilkinson, Walter.* (Analysis of his Evidence)—continued.

Relief to Kingston in time of floods by facilitating the flow of water at Teddington; instance upon the occasion of the bursting of Teddington Lock, 1747-1755—Objection to embankment works at Kingston, 1756—Steps being taken for the adoption of a drainage scheme for Kingston, the drainage now going into the Thames, 1757-1761.

*Windsor.* Representation of Windsor upon the Thames Conservancy, *Darvill* 1422-1425—Liability of the river at Windsor to periodical floods ever since witness has known it; inaccuracy of a statement that there have been only four severe floods since 1821, *ib.* 1426-1428. 1521-1527—Explanation as to the borough of Windsor not having sought to enforce the opening of the weirs, *ib.* 1444-1447. 1464.

Particulars relative to the drainage and sewage works being carried out by the authorities of Windsor for the diversion of the town sewage from the river; large outlay involved, *Darvill* 1448-1463—Liability of some of the houses in Windsor to be flooded, *ib.* 1465. 1485, 1486—Active part taken by Windsor in promoting official inquiry into the question of floods, *ib.* 1466-1468.

Enormous outlay necessary in order to make a flood-course in the river above and below Windsor, *Dod* 1636. 1663-1666—Increase, by about a foot, in the level of the water above Windsor since the construction of a new weir four or five years ago; belief that in high floods the effect of the weir is lost, *ib.* 1641-1647—Improvement in the bed of the river about Windsor in the last thirty years, there having been much dredging, *ib.* 1648-1650—Improved flow of the stream both at Romney Lock and Old Windsor Lock, *ib.* 1651-1653. 1658-1662—Uselessness of an embankment as a protection to Windsor and Eton, *ib.* 1670, 1671.

Great mischief caused by floods to witness' lands and other lands near Windsor, *Lord O. Fitzgerald* 2790-2794.

See also *Eton*.

*Wood, Bryan.* (Analysis of his Evidence.)—Experience of witness as a surveyor and as a former member of the Thames Valley Commission under the Act of 1871; he is well conversant with the district from Lechlade to Newbridge, 857-872—No works done as yet by the Drainage Commissioners in this district, 869-872—Grounds for the conclusion that the Thames Valley Drainage Commissioners should have exclusive jurisdiction above Long Wittenham, and a separate Board be formed for the district below, 873-886.

Evidence in favour of a controlling Government body, with two subsidiary Boards, 887-893. 919-929—Explanation of the benefit derived from the floods, 894-903—Details of works done by the Conservators in witness' district, and the consequent injury to property and navigation, 904-918. 930-935. 970-984. 992—Weirs and high-water marks removed and weeds neglected by the Conservancy, 905-915. 931—Opinion that the Inclosure Commissioners are better qualified than the Board of Trade or Local Government Board to act as a controlling body, 919, 920.

Belief that though land does not let for less in consequence of the injury done by the action of the Conservators, it would have let for more had improvement by irrigation continued, 936, 937—Absence of any real conflict of interest between the land and the navigation, 938, 939—Great benefit resulting from the floods if properly controlled; embankment erected by witness to keep them from the hay, which is much better if not flooded, 940-960—Cost of this embankment about 60*l.* or 70*l.* per mile; now it might amount to 120*l.*, 950. 967.

Full powers of the Drainage Commission to embank under the Inclosure Act, 963—Belief that rating would not be opposed if works were advantageous; only a very small rate would be required for an embankment, 964-966—Statement that the first embankment was made about twenty-five years ago, and that the weirs now removed had been put up from time immemorial, 968, 969—Evidence to the effect that even in dry seasons there is sufficient water for irrigation in witness' district, 985-991.

Examination as to the way in which witness' embankments are affected by the nature of the soil; the floods did not percolate through the gravel subsoil so as to rise to the surface, 1107-1123—Description of certain weirs removed by the Conservators, which were roughly constructed, entirely of wood, and the property of private individuals, 1124-1132.

*Woodbridge, William.* (Analysis of his Evidence.)—Is Mayor of Maidenhead; has had considerable experience in regard to floods in the neighbourhood, 1201, 1202—Extensive and injurious character of the floods in the district in 1876 and 1877; great injury not only to land and houses, but to the health of the inhabitants, 1203-1207. 1226-1232. 1234-1236. 1247-1253—Pollution of the river by the flood-water washing off manure and sewage from the land; reference especially to the effect as regards the sewage or irrigation farm of Maidenhead, 1208-1212. 1265-1283.

Relief as regards Maidenhead, if the locks lower down the river were properly opened and if the sills had not been raised in any case, 1213-1221. 1233. 1238-1240—Willingness

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*Woodbridge, William.* (Analysis of his Evidence)—*continued.*

ness of Maidenhead to pay a moderate rate for floods prevention, 1222, 1223. 1287, 1288  
— Increasing pleasure traffic about Maidenhead, 1224, 1225 — Frequent floods at Maidenhead in recent as compared with former years; effect of the increased drainage of the land, 1227-1229. 1241-1243. 1254-1264.

Opinion that opening the locks is the best protection against floods; difficulty as regards the mills, 1244-1246 — Satisfactory operation of the Maidenhead sewage farm, save in times of floods, 1289-1294.

**WORKS:**

Suggestions as to the works necessary to be executed besides dredging; advisability of making short cuts in the case of considerable curves, *Taylor* 73-80. 107, 108. — Recommendation made in the memorial from Oxford that a sufficient outlet be obtained, beginning at the bottom and proceeding up the river, *Dean of Christchurch* 192, 193 — Suggestion that an engineer appointed by the Government should prepare a scheme for the whole valley from Teddington Lock upwards, *ib.* 194 — Proposal as to the means to be adopted for the abatement of the floods; necessity for more tumbling bays and increased dredging of the river, *ib.* 202-207. 228-240. 267, 268.

Importance of removing all islands and obstructions in the bed of the river, *Charwood* 320. 330. 349 — Expediency of all the works forming part of a general scheme, *ib.* 351 — Practicability of entirely preventing floods in the Thames valley, if engineering skill could be applied regardless of the cost of the necessary works; probable satisfaction to be given by less complete works at a less outlay, *Sir J. Hawkshaw* 1818-1821. 1837, 1838. 1854-1856.

In conjunction with the late Mr. Beardmore, witness made a thorough examination of the river, after the Conservancy Act of 1866; joint report then made setting forth the works required in reference to navigation, prevention of floods, &c., *Leach* 1877-1879. 1882-1884 — Belief that floods in the Thames Valley, though not preventible, may be greatly mitigated by the proposed works, *ib.* 1880, 1881. 1893, 1894 — Necessity of Parliamentary sanction in order to carry out the works proposed at Oxford and below Staines, *ib.* 2146-2148.

Explanation that the scheme of Mr. Leach for extensive works below Staines at an estimated cost of 63,000 *l.*, has never been before the Conservancy Board, *Sir F. Nicholson* 2521 — Importance attached to dredging, and to improvement of the locks and weirs, as a means of preventing ordinary floods; prospect of these measures being accomplished, *ib.* 2925-2928. 2930, 2931. 3029-3032.

Report made by witness' firm in July 1876 as to the works required in the upper Thames and its tributaries; estimate of 88,600 *l.* as the cost for the Thames, and of 22,500 *l.* for the tributaries, *Falkiner* 3105-3113 — This report was made to the Drainage Commissioners, who have not as yet taken any action upon it, *ib.* 3107, 3108. 3115, 3116 — Important mitigation of floods by the proposed works, *ib.* 3114 — Personal inspection upon which the report by witness' firm was based, *ib.* 3125-3129 — Limited effect of the proposed works in times of flood, as regards the quicker discharge of the water, *ib.* 3145-3148.

Report of Mr. Beardmore and Mr. Leach in compliance with the order of the Conservancy Board in February 1867, directing an inquiry with a view to any alterations or improvements for the benefit of the locality of Oxford by relief from floods, *App.* 226-228.

Importance attached by the Committee to the execution of a certain work, at Teddington, estimated to cost 5,000 *l.* *Rep.* vi — Expediency of the construction of certain works which, while improving the navigation, will materially diminish floods, *ib.*

See also *Cuts or Canals.*    *Dredging.*    *Embankments.*    *Impounding Reservoirs.*  
*Islands.*    *Locks.*    *Mills.*    *Oxford.*    *Rate.*    *Revenue and Expenditure.*  
*Stuices.*    *Teddington.*    *Thames Conservancy.*    *Tumbling Bays.*    *Upper River.*  
*Weirs.*

*Wraysbury.* Great injury caused to witness' land and crops near Wraysbury by the floods; particulars hereon, *Pullin* 1300-1302. 1307-1315. 1329-1335. 1370-1375 — Want of dredging operations in the river about Wraysbury, *ib.* 1320. 1379-1382 — Frequency of floods in the Thames about Wraysbury; exceptional character of the flood of 1852, and of that in the present year, *ib.* 1367. 1370-1373.



I N D E  
TO THE  
R E P O R T  
FROM THE  
SELECT COMMITTEE  
ON  
THAMES FLOODS PREVENTED

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*Ordered, by The House of Commons, to be printed,  
27 July 1877.*

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[*Price 7d.*]

367.

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# R E P O R T.

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## Thames River (Prevention of Floods) Bill.

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*Ordered, by The House of Commons, to be Printed,  
21 June 1877.*

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[*Price 8 s.*]





R E P O R T

FROM THE

SELECT COMMITTEE

ON

THAMES RIVER  
(PREVENTION OF FLOODS) BILL;

TOGETHER WITH THE

PROCEEDINGS OF THE COMMITTEE,  
MINUTES OF EVIDENCE,  
AND APPENDIX.

✓  
9

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*Ordered, by The House of Commons, to be Printed,  
21 June 1877.*

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*Tuesday, 6th March 1877.*

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*Ordered, THAT* the THAMES RIVER (PREVENTION OF FLOODS) BILL be read a second time, and committed to a Select Committee of Eleven Members; Six to be nominated by the House, and Five by the Committee of Selection.

*Instruction to the Committee.*—That they have power to inquire into and report upon the most equitable mode of charging and meeting the expense to be incurred under the Bill.

---

*Thursday, 8th March 1877.*

---

*Ordered, THAT* all Petitions against the Bill, presented on or before the eighth day after the Second Reading of the Bill, be referred to the Select Committee on the Bill.

*Ordered, THAT* the Committee have power to send for Persons, Papers, and Records.

*Ordered, THAT* Five be the Quorum of the Committee.

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*Friday, 9th March 1877.*

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*Ordered, THAT* the Petition of William Cory & Sons and others, against the Bill, be referred to the Committee.

---

*Monday, 12th March 1877.*

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*Ordered, THAT* the Petition of Arthur S. Davey and others, against the Bill, be referred to the Committee.

---

*Tuesday, 13th March 1877.*

---

*Ordered, THAT* the Petitions of Millwall Dock Company, Surrey Commercial Dock Company, Beresford, Elmslie & Co., and others, London and St. Katharine's Docks Company, and Wandsworth, be referred to the Committee.

---

*Wednesday, 14th March 1877.*

---

*Ordered, THAT* the Petitions from Limehouse, Conservators of the River Thames, and Westminster, against the Bill, be referred to the Committee.

*Ordered, THAT* the Petition from Robert Gresley Hall, for alteration of the Bill, be referred to the Committee.

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*Saturday, 24th March 1877.*

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*Ordered, THAT* all Petitioners against the Bill who shall have presented their Petitions on or before the eighth day after the Second Reading of the Bill, be entitled to be heard by themselves, their Counsel, Agents, and Witnesses, upon their Petitions, if they think fit, and that Counsel be heard in support of the Bill and against the Petitions.

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*Wednesday, 24th April 1877.*

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Committee nominated of—

Mr. Watney.  
Mr. Ashley.  
Mr. Locke.

Sir Andrew Lusk.  
Sir James M'Garrel-Hogg.  
Mr. Gordon.

Members nominated by the Committee of Selection—

Mr. Hicks.  
Sir George Elliot.  
Mr. Wilson.

Mr. Mark Stewart.  
Mr. Grant Duff.

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*Monday, 7th May 1877.*

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*Ordered, THAT* the parties appearing before the Select Committee on the **THAMES RIVER (PREVENTION OF FLOODS) BILL** have leave to print the Minutes of the Evidence taken before the Committee, day by day, from the Committee Clerk's Copy, if they think fit.

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*Wednesday, 9th May 1877.*

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*Ordered, THAT* the Petitions of the Vestry of Bermondsey and of Francis Bacon & Son, and others, against a new Clause proposed to be introduced into the Bill by the Metropolitan Board of Works, be referred to the Committee.

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## R E P O R T.

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**THE SELECT COMMITTEE** to whom the **THAMES RIVER (PREVENTION OF FLOODS) BILL** was referred, and who were instructed to inquire into and report upon the most equitable mode of charging and meeting the Expenses to be incurred under the **BILL**;—**HAVE** proceeded to examine the allegations of the **Bill**, and taken Evidence thereon, which they have agreed to Report to The House.

**THE** Committee having resolved that the most equitable mode of charging and meeting the Expenses to be incurred for the Prevention of Floods within the Metropolitan District would be, that the Works should be carried into effect by the Metropolitan Board of Works, and the Expenses paid by a rate levied over the whole Metropolitan area, the Metropolitan Board of Works, who were promoting the **Bill**, stated to the Committee that it was not their intention to proceed with the same. The Committee have therefore agreed to report the **Bill**, without Amendment, to The House.

21 *June* 1877.

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## PROCEEDINGS OF THE COMMITTEE.

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*Monday, 7th May 1877.*

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### MEMBERS PRESENT :

Sir James M'Garrel-Hogg. Mr. Grant Duff. Mr. Locke. Mr. Watney. Mr. Gordon.		Sir George Elliot. Mr. Ashley. Mr. Wilson. Mr. Hick. Mr. Mark Stewart.
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Mr. GRANT DUFF was called to the Chair.

The Committee deliberated.

[Adjourned till To-morrow, at a quarter to Twelve o'clock.]

---

*Tuesday, 8th May 1877.*

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### MEMBERS PRESENT ;

Mr. GRANT DUFF in the Chair.

Sir James M'Garrel-Hogg. Mr. Locke. Mr. Hick. Mr. Watney. Mr. Wilson.		Mr. Mark Stewart. Mr. Gordon. Sir Andrew Lusk. Sir George Elliot.
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### THAMES RIVER (PREVENTION OF FLOODS) BILL.

Preamble read the first time.

Counsel:—Mr. Cripps, Q.C., Mr. O'Hara, and Mr. Bazalgette.

Agents:—Messrs. Dyson & Co.

Petitions against the Bill were read from—

- (1.) Wandsworth District Board of Works.  
 Counsel:—Mr. Pembroke Stephens.  
 Agents:—Messrs. Simson & Wakeford.
- (2.) St. Saviour's District Board of Works.  
 Counsel:—Mr. Bidder, Q.C.  
 Agents:—Messrs. Sherwood & Co.
- (3.) St. Olave's District Board of Works.  
 Counsel:—Mr. Armstrong.  
 Agents:—Messrs. Sherwood & Co.
- (4.) Inhabitants of St. Saviour's and Christchurch.  
 Counsel:—Mr. Clark.  
 Agents:—Messrs. Simpson & Palmer.
- (5.) Vestry of St. Mary, Lambeth.  
 Counsel:—Mr. Littler, Q.C., Mr. Michael.  
 Agents:—Messrs. Simson & Wakeford.
- (6.) Board of Works for the Fulham District.  
 Counsel:—Mr. Williams, Q.C., Mr. Locke.  
 Agents:—Messrs. Bradfield.

(7.) William

- (7.) William Cory and Others.  
Counsel:—Mr. *Greene*.  
Agents:—Messrs. *Simson & Wakeford*.
- (8.) Arthur S. Davy and Others.  
Agents:—Messrs. *Simson & Wakeford*.
- (9.) Millwall Dock Company.  
Agent:—Mr. *Rees*.
- (10.) Surrey Commercial Dock Company.  
Agent:—Mr. *Rees*.
- (11.) Beresford, Elmslie, & Co., and Others.  
Counsel:—Mr. *Philbrick*, Q.C.  
                    Mr. *Balfour Brown*.  
Agents:—Messrs. *Wyatt & Co*.
- (12.) London and St. Katharine Docks Company.  
Agent:—Mr. *Rees*.
- (13.) Westminster District Board of Works.  
Agent:—Mr. *Rogers*.
- (14.) Limehouse Board of Works.  
Counsel:—Mr. *Pember*, Q.C., and Mr. *Castle*.  
Agents:—Messrs. *Cooper & Co*.
- (15.) Conservators of the River Thames.  
Counsel:—Mr. *Richards*, Q.C., and Mr. *Richards*.  
Agents:—Messrs. *Wyatt & Co*.
- (16.) Robert Gresley Hall (for alterations).  
Agent:—Mr. *Brown*.
- A Petition was also read from Wandsworth, but no parties appeared in support of the same.
- Mr. *Cripps*, Q.C., was heard to open the case in support of the Preamble of the Bill.
- Evidence in support of the Bill:—  
Sir *Joseph Bazalgette* sworn, and examined.

[Adjourned till To-morrow, at Twelve o'clock.]

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Wednesday, 9th May 1877.

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MEMBERS PRESENT:

Mr. GRANT DUFF in the Chair.

Sir James M'Garrel-Hogg.  
Mr. Gordon.  
Mr. Mark Stewart.  
Mr. Locke.  
Mr. Hicks.

Mr. Watney.  
Mr. Wilson.  
Mr. Ashley.  
Sir Andrew Lusk.  
Sir George Elliot.

Evidence in support of the Bill continued.  
Sir *Joseph Bazalgette*, further examined.

[Adjourned till To-morrow, at Two o'clock.]

---

*Thursday, 10th May 1877.*

## MEMBERS PRESENT:

Mr. GRANT DUFF in the Chair.

Sir James M'Garrel-Hogg.  
Mr. Locke.  
Mr. Hick.  
Mr. Watney.  
Sir George Elliot.

Mr. Ashley.  
Mr. Mark Stewart.  
Mr. Gordon,  
Sir Andrew Lusk.  
Mr. Wilson.

The following Petitions (referred 9th May) against alterations proposed to be introduced into the Bill, were read:

- (1). Francis Bacon and Others.  
Counsel:—Mr. Maclean.  
Agents:—Messrs. Wilkinson & Dew.
- (2). Vestry of Bermondsey.  
Counsel:—Mr. Maclean.  
Agents:—Messrs. Wilkinson & Harrison.

*Resolved*, That the Committee will hear the Petitioners only against the New Clause (referred to in their Petition), which has been introduced into the Bill since the date limited by the House for the presentation of Petitions, and not against any other part of the Bill.

Evidence in support of the Bill continued.

Sir Joseph Bazalgette further examined.

Mr. Henry Laws sworn, and examined.

[Adjourned till To-morrow, at Twelve o'clock.]

*Friday, 11th May 1877.*

## MEMBERS PRESENT:

Mr. GRANT DUFF in the Chair.

Sir James M'Garrel-Hogg.  
Mr. Locke.  
Mr. Hick.  
Mr. Watney.  
Mr. Wilson.

Mr. Ashley.  
Mr. Mark Stewart.  
Mr. Gordon.  
Sir Andrew Lusk.  
Sir George Elliot.

Evidence in support of the Bill continued.

Mr. H. Laws further examined.

Sir James Abernethy, Mr. William Henry Barlow, and Mr. George Edward Link were severally sworn, and examined.

On this witness being asked to produce the minutes of the Metropolitan Board of Works as to a circular issued by them:

Mr. Pember, Q.C., objected, on the ground that the minutes could only be proved by the Clerk of the Board.

Mr. Cripps, Q.C., was heard in reply.

Room cleared.—The Committee deliberated.

Parties called in, and informed, that the Committee could only accept the evidence of this witness as to the issue of the circular, but that the minutes of the Board could only be produced by the Clerk to the Board.

Mr. Cripps, Q.C., on behalf of the Promoters, withdrew the evidence of this witness.

Mr.

Mr. *William Henry Barlow* and Mr. *Henry Law* were severally recalled, and examined.

Mr. *Cripps*, Q.C., stated that this closed the case in support of the Bill, subject to the production of the plans and estimates promised by Sir Joseph Bazalgette.

Mr. *Pember*, Q.C., applied to the Committee to require the Promoters to produce further evidence as to the method of charging and meeting the expenses proposed to be incurred under the Bill.

Mr. *Cripps*, Q.C., was heard to oppose the application.

Mr. *Pember*, Q.C., was heard in reply.

Room cleared.—The Committee deliberated.

Parties called in, and informed, that the Committee did not consider the case of the Promoters complete in respect of evidence as to the incidence of the taxation proposed by the Bill; and that they would expect the Promoters to produce the plans and estimates promised by them before the opponents opened their case.

[Adjourned till Thursday, 7th June, at Twelve o'clock.]

*Thursday, 7th June 1877.*

MEMBERS PRESENT:

Mr. GRANT DUFF in the Chair.

Sir James M'Garrel-Hogg.  
Mr. Gordon.  
Sir George Elliot.  
Mr. Watney.  
Mr. Locke.

Mr. Wilson.  
Mr. Mark Stewart.  
Mr. Ashley.  
Sir Andrew Lusk.

On the Plans and Estimates for the works and on the incidence of the taxation proposed under the Bill :—

Sir *Joseph Bazalgette* re-called, and examined.

Mr. *John M. Roche*, sworn, and examined.

[Adjourned till To-morrow, at Twelve o'clock.]

*Friday, 8th June 1877.*

MEMBERS PRESENT:

Mr. GRANT DUFF in the Chair.

Sir James M'Garrel-Hogg.  
Mr. Gordon.  
Mr. Mark Stewart.  
Mr. Ashley.  
Mr. Locke.

Mr. Wilson.  
Sir Andrew Lusk.  
Sir George Elliot.  
Mr. Watney.

Mr. *John M. Roche* further examined.

[Adjourned till Monday next, at Twelve o'clock.]

*Monday, 11th June 1877.*

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MEMBERS PRESENT :

Mr. GRANT DUFF in the Chair.

Sir James M'Garrel-Hogg.  
Mr. Locke.  
Sir George Elliot.  
Mr. Wilson.

Mr. Mark Stewart  
Mr. Gordon.  
Mr. Watney.

Mr. *Guildford B. Richardson*, sworn, and examined.

Mr. *Charles M. Roche*, re-called, and examined.

[Adjourned till To-morrow, at Twelve o'clock.]

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*Tuesday, 12th June 1877.*

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MEMBERS PRESENT :

Mr. GRANT DUFF in the Chair.

Sir James M'Garrel-Hogg.  
Mr. Gordon.  
Mr. Mark Stewart.  
Mr. Ashley.  
Mr. Hick.

Mr. Locke.  
Mr. Watney.  
Sir Andrew Lusk.  
Sir George Elliot.

Mr. *Guildford Richardson* further examined.

Mr. *Vaughan Richards*, q.c., in support of the Petition of the Conservators of the River Thames ;

Mr. *Littler*, q.c., in support of the Petition of the Vestry of St. Mary Lambeth ;

Mr. *Pember*, q.c., in support of the Petition of the Limehouse Board of Works ;

Mr. *Philbrick*, q.c., in support of the Petition of Beresford, Elmslie & Company, and others ;

Mr. *Williams*, q.c., in support of the Petition of the Board of Works for the Fulham District,

were severally heard against the Preamble of the Bill.

[Adjourned till To-morrow, at Twelve o'clock.]

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*Wednesday, 13th June 1877.*

## MEMBERS PRESENT:

Mr. GRANT DUFF in the Chair.

Mr. Gordon.  
Mr. Hick.  
Mr. Locke.  
Mr. Watney.

Mr. Ashley.  
Sir James M'Garrel-Hogg.  
Sir Andrew Lusk.

Mr. *Clark*, in support of the Petition of the Inhabitants of St. Saviour's and Christ-church;

Mr. *Bidder*, Q.C., in support of the Petition of the Saint Saviour's District Board of Works;

Mr. *Armstrong*, in support of the Petition of the Saint Olave's District Board of Works;

Mr. *Thomas*, in support of the Petition of the Millwall Dock Company;

Mr. *Stephens*, in support of the Petition of the Wandsworth District Board of Works;

Mr. *Greene*, in support of the Petition of William Cory, and others,  
were severally heard against the Preamble of the Bill.

[Adjourned till Friday, at Twelve o'clock.]

*Friday, 15th June 1877.*

## MEMBERS PRESENT:

Mr. GRANT DUFF in the Chair.

Sir James M'Garrel-Hogg.  
Mr. Locke.  
Mr. Hick.  
Mr. Watney.  
Sir George Elliot.

Sir Andrew Lusk.  
Mr. Wilson.  
Mr. Ashley.  
Mr. Mark Stewart.  
Mr. Gordon.

Room cleared.—The Committee deliberated.

Motion made, and Question put, That the most equitable mode of charging and meeting the expenses of preventing floods in the Thames, is the mode proposed in the Thames River (Prevention of Floods) Bill—(Sir James M'Garrel-Hogg).—The Committee divided:

Ayes, 3.

Sir Andrew Lusk.  
Mr. Wilson.  
Sir James M'Garrel-Hogg.

Noes, 7.

Mr. Ashley.  
Mr. Mark Stewart.  
Mr. Gordon.  
Mr. Locke.  
Mr. Hick.  
Mr. Watney.  
Sir George Elliot.

Motion made, and Question proposed, "That the most equitable mode of charging and meeting the expenses to be incurred for the prevention of floods within the Metropolitan district would be that the works should be carried into effect by the Metropolitan Board of Works, and the expenses paid by a rate levied over the whole Metropolitan area"—(Mr. *Hick*).—Amendment proposed, to leave out from the word "that," in line 3, to the end of the Question, in order to add the words, "the costs of any works carried out in any district should be charged one half to the District Board, and one half to the Metropolitan

xii PROCEEDINGS:—THAMES RIVER (PREVENTION OF FLOODS).

Metropolitan Board"—(Mr. *Ashley*)—instead thereof.—Question put, That the words proposed to be left out stand part of the Question.—The Committee divided :

Ayes, 6.  
Mr. Mark Stewart.  
Mr. Gordon.  
Mr. Locke.  
Mr. Hick.  
Mr. Watney.  
Sir George Elliot.

Noes, 4.  
Sir Andrew Lusk.  
Mr. Wilson.  
Mr. Ashley.  
Sir James M'Garrel-Hogg.

Main Question put, and *agreed to*.—*Resolved*, "That the most equitable mode of charging and meeting the expenses to be incurred for the prevention of floods within the Metropolitan District would be that the works should be carried into effect by the Metropolitan Board of Works, and the expenses paid by a rate levied over the whole Metropolitan area."

Parties called in, and informed of the above Resolution.

[Adjourned till Wednesday next, at Twelve o'clock.

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Wednesday, 20th June 1877.

MEMBERS PRESENT:

Mr. GRANT DUFF in the Chair.

Sir James M'Garrel-Hogg.  
Mr. Gordon.  
Mr. Locke.  
Mr. Ashley.

Mr. Mark Stewart.  
Mr. Watney.  
Sir George Elliot.

Mr. *Cripps*, Q.C., on behalf of the Metropolitan Board of Works, stated that it was not their intention to proceed with the Bill.

Mr. *Little*, Q.C., on behalf of the Vestry of St. Mary, Lambeth, applied to the Committee to report their Resolution of the 15th June, on the ground that the Bill being a public Bill it was not in the power of the Metropolitan Board of Works to withdraw it.

Room cleared.—The Committee deliberated.

Proposed Report read, as follows: That the Committee having resolved that the most equitable mode of charging and meeting the expenses to be incurred for the prevention of floods within the Metropolitan District would be that the works should be carried into effect by the Metropolitan Board of Works, and the expenses paid by a rate levied over the whole Metropolis, the Metropolitan Board of Works had stated that it was not their intention to proceed with the Bill.—Question, That this be the Report of the Committee to The House,—put, and *agreed to*.

Bill to be reported, without Amendment.

Parties called in, and informed thereof.

*Ordered*, To Report, together with the Minutes of Evidence, and an Appendix.



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MINUTES OF EVIDENCE.

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# MINUTES OF EVIDENCE.

*Tuesday, 8th May 1877.*

## MEMBERS PRESENT:

Sir George Elliot.	Mr. Locke.
Mr. Gordon.	Sir Andrew Lusk.
Mr. Mountstuart E. Grant Duff.	Mr. Mark Stewart.
Mr. Hick.	Mr. Watney.
Sir James M'Garel-Hogg.	Mr. Wilson.

MOUNTSTUART E. GRANT DUFF, Esq., IN THE CHAIR.

*Sir Joseph Bazalgette, sworn ; Examined by Mr. Bazalgette.*

1. You are Engineer to the Metropolitan Board of Works, are you not?— *Sir J. Bazalgette.*  
I am.

2. And I believe you have held office under them and their predecessors for the last 28 years?—I have. 8 May 1877.

3. Has it been necessary for you, in the course of your official duties, to acquaint yourself with the condition of the River Thames generally, particularly with reference to tidal phenomena?—Yes.

4. I believe, in the course of the observations that you have from time to time made during that period, you have become intimately acquainted with the property abutting upon the banks of the Thames?—Yes.

5. In 1856, before the Metropolis Main Drainage works were executed, did you make a series of observations on the tides and the tidal effects with Captain Burstall?—I did, with Captain Burstall, the Secretary to the Thames Conservators.

6. I presume that the height of each tide is due, in the first place, to the relative positions of the sun and the moon; and secondly, to certain local positions presented by the river?—Yes; the height of each tide is now so well understood that it is calculated to a very great nicety: that is, the height to which the tide should rise if there were no disturbing causes; but there are a number of disturbing causes, which materially alter the height due to lunar influences.

7. I believe those conditions are now calculated to so great a nicety that the Admiralty have made charts showing or predicting when a high tide will, in all probability, occur?—Yes, we frequently see in the "Times" advertisements stating the height to which the tides will rise, or may be expected to rise, subject to those varying conditions to which I have alluded.

8. Apart, in the first place, from fixed conditions attributable to the relative positions of the sun and moon, and also to those local conditions which are so precisely ascertained, there are disturbing causes which come into play and account, to a large extent, for extraordinary tides?—There are first those disturbing causes, and the most important is that of wind; a north-westerly wind

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will

Sir J. Bazalgette.

8 May 1877.

will heap up the tides to a greater extent than any other cause; and looking at the map showing the coast, it will be seen that a north-westerly wind brings the sea into the mouth of the Thames, and forces it up the river; therefore a north-westerly wind, particularly if it should be followed by a south-westerly wind, which would drive the tide in from the south, together necessarily produce very high tides; those high tides sometimes occur at neap tides; then they do not do the damage that they do if they occur at top springs. Then if a heavy gale should be blowing from the north-west, and the river should be in a state of flood from heavy previous rains, of course that again greatly increases the height to which the tide will be forced.

9. Just to keep the causes clear, there is first the occurrence of strong north-westerly gales at the time of high-water spring tide, combined with the fact that a quantity of land-water is coming down from the upper reaches of the river?—The combination of those two causes results in extraordinary high tides.

10. Are you in a position to give some instances of extraordinary tides which have taken place since the year 1099?—I have records of extraordinary high tides, commencing from the year 1099, and there is a record of the river banks having overflowed. I will not go through all of those, but will refer to a few of the most remarkable ones. In 1235, in "Haydn's Dictionary of Dates," it appears that the tide rose so high at Westminster that the lawyers were brought out of the Hall in boats. In 1238 Westminster Palace was flooded. In 1242 the banks burst, and the country was under water for six miles. In 1555 Westminster Hall was again flooded. I am skipping over other high tides between those dates. In 1663 is recorded the greatest tide that was ever remembered in England, all Whitehall having been drowned; and taking the levels of the lowest parts of Whitehall, this appears to have been from 3 to 4 feet above Trinity Standard. That is in 1663. Again in 1732, a high tide overflowed Wapping and Tooley-street. In 1762, the tide flowed into Westminster Hall; in 1763 this again occurred, covering the floor to the depth of 4 feet; this tide was probably about 3·16 feet above Trinity. Then there are various high tides till we come to 1791. A high flood overflowed the banks above Westminster Bridge. In Palace Yard it was 2 feet deep. This is from the "Star" newspaper of the 3rd of February 1791: "Boats came through the passage of Old Palace Yard from the Thames, and round up to Westminster Hall-gate. The two Scotland-yards, Privy Gardens, Whitehall, were under water, and many parts rendered impassible for two hours. Westminster Hall suffered much; the water ran in at the great door for upwards of an hour, and was up to the second step leading to the Court of King's Bench." That tide was proved 2·57 above Trinity high-water mark. In 1821, 28th December, a high spring tide flowed over the banks and wharves between Westminster and Chelsea Hospital, causing great destruction of property. In Millbank the water was so high that the water ran in at the carriage doors of such vehicles as persisted in passing that way, and boats were used, passing to and fro, and carrying the inhabitants to and from their homes. Near Vauxhall Bridge it burst the bank, and the water dashed along with a cataract fury and overwhelming quantity, laying under water the market gardens and fields, and the lower portion of the houses in the district. The level of the tide, as ascertained by the officers of the Westminster Commissioners of Sewers was 3·07. Then follow the dates of high tides varying from 2 feet 6 inches to 3 feet 6 inches above datum.

11. *Chairman.*] How many are there?—In all, I have a record here of 60 or 70. In January 1850 the tide rose to 3·66 above Trinity. In November 1852 it rose to 3·75; and again in November, the same month, to 3 feet. Again in 1854 to 3½ feet above Trinity. Then in 1863 it rose to 3·17, and 3·12 in December. In February 1868 it rose 3·58. In March 1869 it rose to 3·58; and then on the 20th of March 1874, it rose to 4·25. On the 15th of November 1875 it rose to 4·54, which is the highest tide on record; and on the 2nd of January last it rose to 4·12. On four occasions since that it has risen over 3 feet above Trinity high-water mark.

12. *Mr. Bazalgette.*] Then I may take it as the result of those records, extending from the year 1099 up to January of the present year, that the low districts abutting upon the Thames have periodically been subject to a flooding caused by an overflow?—That is so.

13. I presume

13. I presume those records were not kept so accurately in early years as they are now?—No doubt. Sir J. Bazalgette.

14. And probably many floods have occurred of which we have no record?—Yes, that is so. 8 May 1877.

15. Can you describe some of the works or kind of works which have been executed from time to time with the view to prevent these inundations?—Yes. I have before me extracts from the minutes of the Westminster Commissioners of Sewers and the Surrey and Kent Commissioners of Sewers. The Westminster Commissioners' extracts date from 1821 to 1846; they give an account of the defects in the river banks, which the Commissioners of Sewers had repaired by serving notices upon the several persons interested, requiring them to repair those banks. Perhaps I had better read one or two of those. This is the 28th of December 1821: "The chairman, Mr. George Saunders, stated that this special meeting of the court had been called at the late hour of seven of the clock in the evening, in consequence of information having been received at the sewers office that in consequence of a vast descent of water from the uplands meeting a spring tide the River Thames had overflowed the Millbank, Millbank-street, and other low parts of Westminster, whereby there was reason to fear that sundry breaches had taken place in the banks of the river, to the great and imminent danger of all parts below the level of such high tide. Ordered, that immediate notice of such overflow and probable damage be given to the Lords Commissioners of His Majesty's Treasury, the Commissioners of His Majesty's Forests and Land Revenues to Robert, Earl Grosvenor, and all parties concerned, in order that they may take such measures in the emergency as may belong to them. Ordered, that the Commissioners' surveyor do, for the purpose of doing what may be found necessary on this special emergency, take such labourers, workmen, and carriages, timber and other necessities as to him shall seem sufficient for the purpose." Then the surveyor reported that in pursuance of the order which he had received he proceeded to Millbank, where he found an actual breach of about 12 feet in width, and 4 feet in depth in the bank, and that he proceeded to repair it. There was a report upon the extent of the injury. Then there was a report again on the 15th of February 1872, from the surveyor, that there had been an extraordinary high tide of the River Thames on the 26th of July, and it appears to have been produced by a gale of wind blowing strongly from a north-easterly direction the whole of the preceding day, in conjunction with the ordinary spring tide. It was "Ordered, that notice be given to Messrs. Johnson, Son & Price to repair forthwith the wall of the wharf in front of Millbank-row. The committee observed that the bank of the river, in front of the Crown land, from the west side of the Penitentiary of the King's Scholars Pond Sewer was still in want of repair. The committee also observed that the camp sheeting in front of land belonging to Earl Grosvenor, in the occupation of Mr. Fuller, gardener, required repair, and directed that notice should be given thereof in order that the necessary repairs may be done." The clerk was directed to report as to the usual practice of the Commissioners on repair of breaches, and he reports, "In obedience to the order of the court on the 8th May last, that I should make to the court a written report on the usual practice of the court relative to restraining the overflow of the River Thames where the same becomes injurious to the public, as in the case of the public highway at Chelsea, called 'the Road along Shore,' stated to be flooded and injured by the tide, whether it has been the practice of the Commissioners to find a remedy, or see that one be found. I beg leave to state that after a careful examination of the records of the court, I do not find any case in point, that is where a highway has been flooded and injured by the tide. There appear many cases on the report of the Commissioners where the Thames bank has been broken, and in those cases the Commissioners have required the parties whose adjoining lands being below the level of the land have been defended by the banks, to repair and make them good, but when any great and sudden emergency has arisen the Commissioners have themselves repaired any breach that may have been found in the bank and called upon the owners of the adjoining land to make good the expense."

16. As I understand the extract, the clerk was instructed to report as to whether any precedent existed as to flooding in the case of a highway, and in addition

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addition to that, while he says he found no precedent for it there, he defines the usual practice of the Commissioners?—It was so. Then I will refer to one or two cases from the minutes of the Commissioners of the Surrey and Kent Commission. Here is a case where an order of the court was made on the 8th of August 1828: “Mr. Newman, pursuant to the order of the last court, laid before the present court a list containing the names of the occupiers of the premises adjoining the banks of the Thames in Rotherhithe, with the dimensions to which he recommended they should be severally required to repair and raise the same. And the same being read, was referred to the consideration of the next court appointed to be holden for the purpose of viewing the premises.” They viewed the premises and made an order upon a long list of persons, each of whom was called upon to raise his wharf, stone wharves, and ship yards and timber wharves along the river, a height varying generally from 1 foot to 2 feet 6 inches, 10 inches being the minimum. There is a very long list of those. Those persons were ordered to raise their wharves; some did not raise their wharves, and were summoned and fined for not having done so. The “Report from Mr. Newman was also read, of Mr. John Ward of Rotherhithe having omitted to raise the banks of his wharf as directed by the order of the court on the 29th day of August last. Ordered, that the said John Ward be and hereby is fined the sum of 100*l.* for his contempt of the said order, and that he be summoned to the next court to show cause why the said fine should not be estreated into His Majesty’s Court of Exchequer.” Then about the time of the removal of old London Bridge, “The court took into consideration the probability of its becoming necessary to raise the bank of the river above London Bridge, on an expectation that upon the removal of the present old bridge the tide would flow higher than heretofore accustomed. Ordered, that each of the surveyors to this Commission be desired to report to the court their opinion of the effect of the removal of the old bridge upon the tide, and the additional length (if any) that the banks of the river above bridge should be raised.” Then a very interesting report is made by the surveyors on the condition of the Thames, and the causes effecting high tides; but they come to the conclusion that the tide would probably be raised not more than six inches in height by the removal of old London Bridge as the maximum; and they think that no general raising of the banks is necessary in consequence thereof.” There is one other notice here which I think is important; that is, that on the 27th day of May 1863, it was “Ordered, on the recommendation of the Committee for General Purposes, that the banks of the River Thames between the Old Barge House, in Christchurch, and the new London Bridge be raised to the height of the highest known tide, being that reaching three feet above Trinity House mark, and that proper marks — — —”

17. Just to get the facts of the Commissions clear, when necessity required it, on the report of their surveyor, they made orders upon the individual riparian owners or occupiers to raise their banks at their own expense?—Yes.

18. And in default of their raising the banks, or doing the necessary works, they imposed a fine?—Yes.

19. That was the practice?—Yes.

20. And that practice was continued up to the year 1855, or the year of the constitution of the Metropolitan Board of Works?—Yes; the last record I have of its being acted upon is 1847.

21. In 1855 was the jurisdiction of these Commissioners superseded by district vestries and district boards within the metropolis?—Yes.

22. And the property of the Commissioners was transferred to the Metropolitan Board of Works?—Yes; and the vestries and district boards.

23. And in that way the records from which you have now been quoting came into, and are now in, the possession of the Metropolitan Board?—Yes.

24. Therefore I may take it that, to all intents and purposes, you are now quoting from your own records?—Yes, from ancient documents in the possession of the Metropolitan Board of Works.

25. Just to make it clear, I believe these powers of the old Commissioners were first of all transferred to the Metropolitan Commissioners of Sewers in 1848?—Yes.

26. Mr. *Williams*.] I must object to my learned friend examining the witness before

before you in this way; he is here to speak to facts; if my learned friend seeks to make any deduction of law from Acts of Parliament, that is a matter of law and not a matter for a witness to speak to.

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Mr. *Cripps* was heard in support of his line of examination.

27. Mr. *Bazalgette*.] These records were first transferred to the Commissioners of Sewers in 1848, and then to the Metropolitan Board of Works in 1855?—That is so.

28. That is to say, you, the Metropolitan Board of Works, were established for the Metropolitan Commissioners of Sewers?—Yes.

29. You having held office under both parties?—Yes.

30. By the year 1866 the Metropolitan Board, I believe, completed their intercepting main drainage system?—Yes.

31. What was the effect of that as regards the River Thames?—The effect as regards the Thames was, that a very large body of water which formerly flowed into the Thames above London, amounting to 607,000 tons per diem, was diverted to a point below London and discharged upon the ebbing tide, so that to this extent the tendency to flooding was reduced by those works.

32. That is to say by the execution of the works the tendency to flooding was reduced to the extent of 600,000 tons of sewage per diem?—It took 600,000 tons of sewage which formerly came in above London, and put it into the Thames at a lower point.

33. And is that amount larger in volume than the amount of water which formerly found position on the sites of the three embankments which have been executed by the Metropolitan Board?—Yes, taking the total area of the three embankments up to the height of Trinity high-water mark, and reducing it to tons, it would be 587,000, or somewhat less than the quantity removed from the upper reaches of the Thames by the Metropolitan Main Drainage, and pumped into the Thames at a lower point.

34. In what year was the Victoria Embankment completed?—The Victoria Embankment was completed in 1870.

35. July 1870?—July 1870.

36. And the Albert Embankment;—In November 1869.

37. The Chelsea Embankment?—In April 1874.

38. What is the total area which has been reclaimed by those three embankments?—51 acres; that is about 7 acres by the Albert Embankment, 9 acres by the Chelsea Embankment, and 35 acres by the Victoria Embankment.

39. You have already stated that by the construction of those embankments about 587,000 tons of water have been excluded from that region of the Thames?—Yes.

40. Now I ask, as a matter of fact, whether, during the last few years, there has been a gradual rising and a gradual depression of the tides within the metropolitan area?—There has been an increased volume of water coming up the Thames.

41. That is to say, within the last few years the spring tides have risen higher and fallen lower than formerly?—That is so.

42. Can that rising and depression be in any way attributable to the construction of the Thames Embankment?—No, it cannot.

43. What are the particular forces which come into play, and which affect the momentum of the tidal wave as it passes up the river?—The momentum of the tidal wave is checked by the friction of its bed, by obstructions placed across the river, and by the laws of gravity, and removing any one of those obstructions will cause a greater volume of tide to pass up the river.

44. I presume that as you place artificial obstructions in the bed of the river, so the amount of tide water finding its way up will be reduced?—Clearly.

45. Can you mention some of those obstructions, the removal of which has caused a larger quantity of tidal water to find its way up the river than formerly was the case?—The removal of London Bridge has caused a very much larger volume of water to pass up the river than passed up formerly, and that may be exemplified by stating that before the removal of old London Bridge the sectional area of the river, 300 feet below it, was 23,400 superficial feet; 300



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feet above it, it was 19,380 superficial feet, whilst through old London Bridge the sectional area was only 7,360 superficial feet.

46. That is to say, the sectional area through the bridge was only one-third of that which had been presented 300 feet below the bridge?—Yes, so that the whole of the sectional area of the river above and below it were two-thirds greater, to be reduced in passing through the bridge to one-third; of course, that formed a very serious obstruction to the passing of the tide, and prevented a considerable volume of water passing up the river.

47. What was the effect of the destruction of the old bridge, and the substitution of the new bridge, as regards sectional capacity?—It at once increased the sectional area from 7,360 to 17,600.

48. That is to say, the area was increased by such substitution to two-and-a-half times what it originally was?—Yes.

49. Was the effect of increasing the sectional area to at the same time allow more tidal water to find its way up, and the upland water to find its way more rapidly down?—Yes, and it allowed the tide to ebb lower, and thereby expose the banks above the bridge, which were dredged away, and the increased volume of tide rising and falling every day gave an increased scour, and has maintained since that period the bed of the river at a deeper level. Of course all these operations, whilst sending up more tidal volume and raising the height of the water, have been of the utmost importance to the navigation, and a vast improvement to the navigation.

50. Is what you have said as regards old London Bridge and its removal equally true with regard to old Blackfriars Bridge and old Westminster Bridge?—It is not quite to the same extent. I may mention that with regard to old Blackfriars Bridge the area of the river was increased, through Blackfriars Bridge, from 13,000 to 16,000, and through old Westminster Bridge from 13,000 to 18,000 at the present time.

51. Just as illustrating the fact that the tidal level has been actually raised, I believe you had some observations taken by Mr. Page, extending over the years 1823 to 1835?—Mr. Henry Laws made those observations for Mr. Page.

52. Take first of all the years 1823 to 1835 to show what the increased elevation at high water at Waterloo Bridge was during that period?—The increased height of high water between 1823 and 1835 was seven inches, that is, taking the same period of the year, and extending the observations under the same conditions of the moon over the month, and taking the average.

53. Now take 1843 to 1845, what was the increase at the same point?—I have another observation between 1835 and 1843. During that period, taking the observations in the same way, the high water had been raised six inches.

54. And now 1843 to 1845?—And between 1843 and 1845 it was raised an inch and a quarter, so that between 1823 and 1845 there had been a raising of the high water level on the average of 14 inches and a quarter.

55. That is to say in a period of 20 years?—In a period of 22 years.

56. In addition to the level of the high water having been raised, do you find a corresponding depression has taken place during that period in the level of low water?—To a greater extent the low water has been lowered; the low water between 1825 and 1845 had lowered 3·6 inches, which if added to the increased height of 14½ inches, gave an increased range of tide of 4 feet 8½, which means that a larger volume of water passed up and down the river at each tide to that extent, and that is represented, by an increase above London Bridge, of tidal water from 13,000,000 tons to 18,000,000 tons each tide.

57. And this increased range of tide, amounting to 4 feet 8½ inches, took place before the creation of the Metropolitan Board of Works?—Yes, that is down to 1845.

58. Now I will ask whether the effect upon the construction of the embankment has been in any way to introduce a new obstruction for the tidal range?—No.

59. Can you illustrate that by referring to the sectional area of the river at certain points, before the construction of the embankments, and subsequently to their construction?—Yes; I see the prevalent idea seems to have been that the embankments, by narrowing the channel, pushed over the water, or something of that kind, to the south side; but that cannot be so, because, taking that view of it,

it, supposing it were possible that it could be pushed over in that way, by being put into a narrower space, it will be found that at Southwark Bridge, at the present time, there is only a waterway which is below the Victoria Embankment of 14,200 superficial feet, whereas opposite to the embankment, which is at a higher point than Southwark Bridge, that tide which has passed through an area of 14,000 feet, has then to expand itself into areas varying from 19,000 to 20,000 feet, taking the narrowest to the widest point. So again, opposite the Albert Embankment, the areas are 17,000, 15,000, and 13,000, whereas at Battersea Bridge, just above, it is 8,900 only, and at Vauxhall Bridge 13,000; whilst between Battersea and Vauxhall the minimum is 13,000, and the maximum 16,000; that is at high water, that is up to Trinity high water. I take one common basis, and the same comparison will bear good at any time of tide.

60. So that in each case where you approach an embankment, there is a point before you arrive at it where the sectional area of the channel is less than the sectional area of the channel opposite the embankment itself?—Yes.

61. You have already stated that in addition to the fact that the construction of these embankments has not reduced the sectional area of the river so as to cause flooding, you have also by the main drainage system diverted a quantity of water which found its way into the river at that spot, equivalent to that which occupies the sites of the three embankments?—Yes.

62. With regard to the suggestion that the tidal waters had been deflected by the Thames Embankment on the opposite shore, is that not again contrary to well known hydraulic principles?—Tidal water will, of course, maintain its level.

63. Is it not true that tidal water naturally flows upon the concave side of the river, and can only be deflected by a projection?—Yes.

64. Now, coming to the flood of January last, did you, after its occurrence, inspect the flooded districts?—I did.

65. What was the result of your inspection?—I found that the tide, particularly in Lambeth, in the neighbourhood of Nine Elms, and also extending down the bank of the river near to Blackfriars Bridge, and on the north side in the neighbourhood of Wapping, had overflowed to a very serious extent; some portion of the land is lower at a distance from the river than the wharves which are close to the river, and therefore the tide which overflowed those wharves poured into those low spots, and filled them up to a great depth. I saw many of the houses where the water had stood up to six or seven feet above the floor of the houses. The people were driven out of them into the upper floors, or had to escape from the neighbourhood altogether, and the result was great misery, and the property of the poorer people was destroyed, and they were rendered homeless; they had to take refuge in the churches, and in any place they could get refuge in.

66. Did you find that the damage actually done to property was great?—I did, very great indeed, and what struck me most was, that so much serious damage should be done, when such slight precautions would have prevented it all.

67. I believe you embodied the result of your observations in a report which was presented to the Metropolitan Board of Works on the 4th January 1877?—I did.

68. Have you copies of that report?—I have a copy of that report in my hand.

69. Will you shortly give the effect of that report?—It is dated the 4th of January 1877. "On Tuesday the 2nd instant the tide, at 3 a.m., rose to a height of about 4 feet above Trinity high-water mark, or to within about 6 inches of the level reached by the extraordinary tide of November 1875. This unusual height of the tide appears to have been mainly due to the accumulation of the water of the remarkably heavy and continuous rainfall in conjunction with the high spring tides, and cannot be attributed to the formation of the new embankments on either side of the river. The width of the narrow part of the river opposite Millbank was increased by dredging, and the setting back of the Albert Embankment from 600 feet to 720 feet, and the width of the river opposite the Victoria Embankment is still from 880 feet to 1,125 feet between Westminster and Blackfriars bridges, whereas the arches of Southwark Bridge will certainly not be obstructed by greater width between the embankments above it. Again, it has been argued that the altera-

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tion of the channel from the north side of the river nearer to the south side has caused the main current to flow nearer to the south side than formerly, and has thus heaped up the waters, but the surface of the water in the main current of a river is not higher than at its sides. Uniform width produces uniform scour, and a better channel for the discharge of flood water, and unnecessary width only diverts the current into eddies, which form accumulations of mud: the rainfall of the past month has exceeded six inches, being in one month more than a fourth of the average annual rainfall. The valleys of the Thames and its tributaries above London are now inundated almost to their sources; the outflow of the accumulated waters meeting, and being retarded by the high water of high spring tides has caused them to heap up and overflow the lower districts of the metropolis, thereby occasioning greater destruction of property and other serious evils. Within the last two days I have inspected many of the localities which have been flooded, and in my judgment it would be possible by the expenditure of small sums of money by the owners or occupiers of the river-side property, not in the aggregate exceeding the cost of an Act of Parliament, and in far less time than would be occupied in obtaining such an Act, so to raise the wharf walls, draw docks, and stairs, as to protect the main bulk of the house and wharf property from future injury. The localities which have suffered most are in Lambeth, and Southwark, on the Surrey side, and the neighbourhood of Wapping, on the north side of the river. The Nine Elms Station of the South Western Railway presents a frontage of about a quarter of a mile to the river; and the wharf wall, although in part above the level of the adjoining wharves, is not high enough, and the river, on Tuesday, poured over this wharf to a depth of from six to nine inches, discharging an immense volume of water into the lower and thickly inhabited districts. The vestry of Lambeth, in April 1874, served a notice upon the railway company to raise their wharf wall, but this has not been done, and it is obvious that a 12-inch baulk of timber, bolted down along the top of this wall, at a cost of less than 300 *l.*, would have saved any overflow from these premises. The Brighton Railway Company's goods wharf, near the new Foreign Cattle Market, Deptford, is another similar instance, and these are types of many other cases. At Messrs. Johnson's coal wharf, and at Mr. Foy's forage wharf, where serious overflow took place, an expenditure of probably 5 *l.* at each wharf, in adding a few courses of brickwork to the wall would have saved any overflow, and there are probably a few more similar cases in this locality. The White Hart drawdock, and Messrs. Sharp and Jones' drawdock, require raising at comparatively small cost, but it would render them less convenient by causing steeper approaches. Below Westminster Bridge, along the Belvidere-road, and the Commercial-road, are the extensive premises of Messrs. Lucas Brothers, Messrs. Holland and Hannen, the Aylesford and Burnham Companies wharves, Messrs. Davey and Thompson's coal wharf, the Thames Dock, and others, all of which have been overflowed, to the damage of their own premises, and the destruction of the poorer property behind them. The raising of the coping, and laying under it a few courses of brickwork, would have prevented all this mischief. Some of the owners now propose to do this; others say what is the use of doing it unless their neighbours do it also. And I am satisfied it is only necessary in the great majority of these cases for the vestries and district boards to point out to the owners the necessity of these works, and the simplicity of them, to induce them at once to provide the remedy. For those who neglect it, compulsory powers should be obtained. At Wapping, on the north side of the river, Boyce's Granite Wharf, Hoare's Brewery Wharf, South Devon Wharf, and some others require raising in the same way. Union Stairs and Alderman Stairs should be raised by the vestry, as has been done in similar cases by the Limehouse District Board at small cost and with perfect success. There is, however, a class of property more difficult to deal with, viz., those wharves where the main floors and sills of the doors or loopholes are below the level of extraordinary high tides; these could in most cases not be raised without serious obstruction to the business carried on in them; they are generally provided with slides or dams which can at a moment's notice be fixed on doorways or loopholes, and these slides, if properly made, would answer the purpose, if used; but as high tides occur at distant periods only and then frequently in the night time, the probability is these slides are, as a rule, left out when required.

required. A regulation that such slides should be kept in proper order and fixed in their places after business hours, with a heavy penalty attaching to the neglect of these obligations, might meet this difficulty. By the combined effort of a few wharfingers and district boards and vestries, I venture to affirm that it is quite possible, at an expenditure of a few thousand pounds, and within the next six weeks, to prevent the overflow of the Thames within the denser portions of the metropolis by the highest tides that have ever yet been recorded. All persons desiring information as to the height to which their premises should be raised or as to the best means of raising or protecting them, might obtain the information on application at the offices of this Board. On the other hand, if a new and uniform embankment is to be formed by any public body along the rest of the southern bank of the Thames, similar to the Victoria and Albert Embankments, the expenditure on works, although very large, will be much less than the expenditure for compensation for injury done to the business of the wharves along that shore, and the cost must be counted in millions. Again, should a public body obtain powers to enter upon private premises to execute the minor works above described, unless it be done in default of an obligation cast upon the owners, many of the owners will demand of that body works of a more costly character than would otherwise be deemed necessary, and will claim compensation for temporary interruption of business, and for permanent damage to the premises for trade purposes. The alterations of doors and loopholes could hardly be met by a public body without the rebuilding of the premises. At Fulham, Battersea, and Wandsworth, and above the metropolitan area, earthen river banks might be raised and maintained by the owners, under the direction of a controlling authority, as are now the banks of the Thames, which from time immemorial have, under various ancient Commissions, been maintained for the protection of the low levels and marsh lands below London. I recommend that this Report be referred to the Works, &c. Committee, with power to take such course as they may deem necessary."

70. That report of January 1877 was referred to the Board in the first place, and they having considered it, referred it to a Committee?—Yes.

71. Was action taken upon that report in the shape of a circular letter of advice being sent out to the different riparian owners and occupiers on the banks of the inundated portions of the Thames?—The result was that the Metropolitan Board of Works sent a letter to all persons having property along the banks of the river, within their jurisdiction, a copy of which I will read.

72. Was that letter dated the 10th of January 1877?—The letter was dated at various times in January. Of course a large number of them had to be sent out, something like 800; 870 had to be sent out.

73. I see this letter is in these terms: "Sir, —The attention of the Metropolitan Board of Works has been directed to the serious evils resulting from the overflow of the Thames within the limits of the metropolis, on the occasion of the recent spring tides. This is the fourth inundation of the kind within three years, the first two having taken place in March and April 1874, and the third in November 1875; and considering the heavy falls of rain still going on, and the consequent increase in the flood waters of the Thames, there is some reason to fear the possibility of another overflow at the next or ensuing spring tides. These inundations, it is hardly necessary to remind you, are most disastrous to the poorer classes, whose dwellings are for the most part in the rear of the wharves, warehouses, and other business premises on the banks of the river. The Board therefore feels it to be its duty to direct the attention of all owners and occupiers of property on the foreshore of the Thames to the necessity of at once taking measures, by raising the frontage of the property exposed to inundation, to prevent a recurrence of the overflows. The Board does not doubt that everyone interested in riverside property will be desirous to do all in his power to insure that, so far as regards such property, the overflow of the river shall be effectually prevented. The Board's engineer has been considering the best way of applying an effectual and prompt remedy, in the absence of any orders or plans, for a complete system of protection against inundations, and it appears to the Board that it may be of value to communicate to you his view of the means of preventing further mischief. I am accordingly directed to acquaint you that Sir Joseph Bazalgette is of opinion that, to ensure safety, the frontage of your property exposed to inundation would require to be raised not less than

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feet inches"—That was filled in in each case according to the required height of the premises.

74. "In making this communication, however, I am to state that it is not the intention of the Board to interfere with the duties and obligations of the vestries and district boards who are specially charged with these matters by the Act of Parliament, or in any way to put aside the authority of any such bodies;" this letter was only a letter of advice, and was in no way a mandatory letter to the person to whom it was addressed?—That is so.

75. I believe that since that letter was sent out you have caused an inspection again to be made of the river-side premises, with the view of seeing whether any steps should be taken in consequence?—Yes, I caused an examination of the premises to be made in the latter end of March, all along the banks of the river.

76. Did you then make a report, stating the result of such examination?—Yes; I hold in my hand a copy of the report, giving a list of those who fully complied with what was necessary, those who did it in a temporary way, and those who did not do any works, and the result was that the number of notices complied with was about 200; those which complied partially, that is raised their banks not quite to the sufficient height, or did it in a temporary manner, were 130, and those who did not do so were 540.

77. That is to say, about two-fifths have done work in pursuance of the letter, and three-fifths have taken no action?—Yes; but, as regards the actual works done, there is a larger proportion done than that; that is as regards the number. For instance, the London and South Western Railway Company raised their wharf, which extended for a quarter of a mile.

78. What height did the London and South Western Company raise it?—They raised it 2 feet; from 3 feet above Trinity to 5 feet above Trinity.

79. Will the effect of such works be to prevent flooding behind them in the future?—Undoubtedly. If that had been done before it would have saved a vast deal more money than it cost to do it, 10 times over.

80. Now take the second case?—The London, Brighton, and South Coast Railway Company have raised their frontage there, excepting a gap of about 50 feet, which they have left to carry on the loading of goods, and they have clay and materials ready in case of flood to fill up the gap quickly.

81. I suppose these alterations, as a rule, if taken separately, would be small in point of works?—They are small.

82. In order to be able to appreciate their just effect it would be almost necessary to see them, so that you might see how they stand in connection with the adjoining property?—I think it would give a more exact appreciation to view them, and see what the character of the works is that have been done, and those required to be done, than any explanation that could be given in this room.

83. Have you also obtained information with regard to the frontage of the Royal Victualling Yard, Deptford?—Yes, I am informed that the Admiralty propose to raise the Royal Victualling Yard at Deptford to a proper height.

84. And the same thing is proposed to the frontage of the Foreign Cattle Market at Deptford?—The Corporation propose to do the same thing as to the Foreign Cattle Market.

85. The result of your report goes to show this, that though numerically two-fifths have complied with the terms of the letter of advice, yet the works actually executed in pursuance of it bear a very much greater proportion to the total amount?—The works requiring to be done amount to nearly one-half.

86. Are the details of such compliance and non-compliance fully set forth in that report?—They are; they are shown in sections. These sections show every wharf along the river, and the red colour represents where persons have raised their wharves in consequence of that letter; wherever you see the red places there the wharves have been raised to the required height; the red line is five feet above Trinity high-water mark.

87. Mr. Hick.] That is higher than any tide that we have upon record?—That is six inches higher than any tide that we have upon record. At Fulham this bank has been raised at a distance away from the bed of the river, and the tide has been allowed to flow over the marshes up to that bank. This is another section. This is Charing Cross Bridge and Waterloo Bridge. All these places have been raised; these are places where barges come alongside and land their goods on to these wharves, and where the raising of the wharves would be very inconvenient

inconvenient to business ; there they put in a slide, and if there was a regulation that the slides should always be in, excepting when business is carried on, and that they should be properly formed, they would keep out the tide sufficiently.

88. *Chairman.*] There is no authority now to enforce it?—No, it would have to be done by Act of Parliament. The river police might have authority to look after them, and have a portion of the fine given as a reward whenever they detect them left out of place; then they would look after them, and see that it was done. It would be done by a bye-law if the Bill passes.

89. *Mr. Watney.*] Have you power under this Bill, if it passes, to see that it is done?—If the Bill passes we should make a bye-law carrying that into effect; in some cases requiring them to raise the wall to a certain level, and in other cases requiring them to put in tide boards. This is the Victoria Embankment. This is the London and South Western Railway; all this has been raised (*explaining the same*); the want of that was the cause of an immense amount of damage; the tide running over it sent in a body of water which did a fearful amount of damage. Here is another (*producing another section*).

90. *Mr. Locke.*] Do those that were put in answer?—Yes; we have had no tide more than 4 feet 6; these are up to 5 feet. Here is a case where they have not raised their wall to 5 feet (*the Witness explained the section to the Committee*).

91. *Mr. Bazalgette.*] I understand that those sections show the details of the work that has been already executed in pursuance of the Board's letter of advice?—They do.

92. And probably some of the works are of a temporary character, and require careful supervision in order to preserve them in a proper and efficient state?—Yes; the great object is to control them from time to time, because although no tide ever had risen higher than 4 feet 6 above Trinity high-water mark up to the present time, it is possible that we may have higher tides, and it might be necessary to raise them still higher.

93. Did you find a disposition on the part of several of the wharfingers to comply with the letter of advice, and did they state that there were obstacles in the way of their doing so?—They did; many of them said to me, "We are very ready to raise our wharves if our neighbours would do so also, but what is the good of our raising our wharves if the tide can come over the adjoining wharves and come round behind us and pass into our premises that way?" I saw a case above Battersea Bridge in which two occupiers of property had commenced raising their wharves. One of them had completed it, and the other had raised it half way, but finding that the one between them would not raise his the one who had not completed his stopped doing so and said, "What is the use of my going on, because my neighbour will not raise his, and we shall be flooded as bad as ever."

94. So that in addition to those who have conformed to the Board's letter, there are some who would willingly comply with it, if they saw their way to their neighbours being compelled to do the same?—Yes, many; that is their general feeling, as far as I can judge.

95. And I presume that in the execution of these works there are in some cases special difficulties which are met, and which have to be especially provided for?—Yes.

96. Take the case of the loopholes in warehouses; how would you deal with them?—I propose to deal with them much upon the principle upon which they are now dealt with, but more effectually; that is to say, having properly formed grooves with a door slide fixing into the groove, which shall be made watertight and which shall be easily taken in and out, I should propose to take such steps as should secure those slides being in their places at all times except when business was going on in the warehouses. When business is going on there are people about, and there is no fear of flooding taking place.

97. The object of introducing that sort of precaution would be to avoid as much as possible interference with the premises as business premises?—Yes, it would require each case to be considered, and to adapt the remedy to the business carried on in the most convenient way that it could be done.

98. Would it be necessary that there should be some general supervision of these slides, which you have just described, in order to see that at times of

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emergency they are kept properly closed?—It never would have any effect without some general supervision, not only as regards the slides, but as regards the raising of the wharves themselves to a proper height, and maintaining them at the proper height, and the maintaining of the walls in such a condition that they shall not leak, and that the tide shall not pass through them; they should be kept repaired and water-tight. There are some at the present time, where the tide flows through the walls, they are so badly constructed.

99. Take the case where draw-docks come up archways under buildings?—Yes.

100. Would you deal with them by the erection of gates?—That can be met much in the same way, by gates placed across the top of the draw-dock, which shall be opened whenever required for business purposes.

101. And I suppose the dock entrances can be dealt with much in the same sort of way?—Yes, under regulations. Supposing the docks were not high enough, by raising the frontage to the river and raising the dock gates, they may be made to keep out high tides in the same way, under proper regulations.

102. The great object in each case being to provide proper protection for the low-lying property, and at the same time to interfere as little as possible with the business going on at the premises?—Yes.

103. The different works would be designed bearing those two points in mind?—Yes.

104. I will ask generally whether, in your opinion, bearing in mind the evidence you have given as regards the inundation of the ground, and the remedy which you suggest to provide against it, it is necessary that such a Bill as has been brought in before the Committee should be passed into law?—Absolutely necessary; it will never be done without.

#### Cross-examined by Mr. Richards.

105. I will ask a few questions on behalf of the Conservators of the River Thames; I daresay you are aware that that body, the Conservators of the River Thames, were established by the Thames Conservancy Act, 1857?—Yes.

106. I will first take the petition of the Conservators, and you will perhaps tell me whether this is correct: the Conservators “were incorporated as the Conservators of the River Thames by the Thames Conservancy Act, 1857”?—Yes.

107. And by the same Act all the estate and interest of the mayor, commonalty and citizens of the City of London, and of Her Majesty the Queen, in the bed, soil, and shores of the River Thames from Staines, in the county of Middlesex, to Yantlett Creek, in the county of Kent, and all the powers and authorities, rights, and privileges of Her Majesty in right of Her Crown, and of the Corporation of London, with regard or relative to the conservancy, preservation, and regulation of the River Thames within the limits aforesaid, are vested in your petitioners?—I have no doubt that is so generally, but I am not familiar with the Act.

108. I will call your attention to the Thames Conservancy Act, 1857, Section 50: “All the estate, right, title, and interest of the mayor, commonalty, and citizens of the City of London, in the bed, soil, and shores of the River Thames” (you will find these words important), from Staines in the county of Middlesex to Yantlett in the county of Kent, and all the estate, right, title, and interest, to which Her Majesty was, on the 23rd day of February 1857 entitled, in right of Her Crown, of, in, and to the bed and soil and shores of the River Thames, within the flux and reflux of the tides, bounded eastward by an imaginary line to be drawn from the entrance of Yantlett Creek in the county of Kent, on the southern shore of the said river, to the City Stone, opposite to Conway Island in the county of Essex, on the northern shore of the said river, and of, in, and to all encroachments, embankments, and inclosures therefrom or thereupon, except such parts thereof as are hereinafter specified, shall, from and after the commencement of this Act be, and the same are hereby vested in the Conservators.” Are you aware also, that under the same Act, Section 57, the Conservators may grant licenses for the erection of piers and jetties?—Yes.

109. And by Section 58 a certain consideration for such licenses is to be paid to the Conservators?—Yes.

110. They are at liberty to exact certain tolls for the use of such jetties, and so on?—Yes.

111. One-third of the tolls coming from that source into the till of the Conservators is to be handed over to the Crown?—I am not aware of that.

112. Then



112. Then the marginal note to Section 103 is, "Annual statement of account of all monies received for sales, &c. of bed of River Thames to be sent to the Commissioners of Woods and Forests;" then the marginal note to Section 104 is, "The Conservators to pay to Her Majesty one-third of moneys, &c.;" the section says, "The Conservators shall, on or before the 1st day of March in each and every year for ever hereafter, pay over one equal third part of all the sums of money, rents, and proceeds which may have been received in manner aforesaid during the year ending on the 31st day of December immediately preceding unto the Commissioners of Her Majesty's Woods, Forests, and Land Revenues on behalf of the Queen's Majesty, her heirs and successors, to be applied as part of the hereditary possessions and land revenues of the Crown, and the remaining two-third parts thereof shall be applied for the general purposes of this Act;" the Thames Conservancy are a representative body, are they not?—Yes.

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113. A representative body, of which a certain number are elected from wharfingers and people interested in the river?—Yes.

114. And anything that they do as a public body is totally apart from private interest?—I presume so.

115. Now I will call attention to some of the clauses of your Act; in the first place, in Clauses 5, 6, and 7, it appears that you may, as the Metropolitan Board, order vestries and district boards to do almost any act which you yourselves may think necessary for preserving the land on the borders of the Thames from flood water?—The necessary works.

116. You take by this absolute and entire authority in respect of anybody by Clauses 5, 6, and 7?—Yes; we take power to require the necessary works to be done.

117. And you take power also to do the works if other people do not do them?—Yes.

118. And to charge people for them?—Yes.

119. And also it strikes one as remarkable, without anywhere depositing any plans showing what your scheme is?—Depositing where?

120. Anywhere; if you come before Parliament you must deposit plans of engineering, and so on, but here you do not propose to deposit any plans?—Where should they be deposited?

121. Do you propose before you carry any works into effect anywhere to deposit any plans showing what the works are to be?—I apprehend if we propose to do any works interfering with the bed of the river we should be bound to deposit plans with the Thames Conservancy, and get their consent.

122. That is your intention, at any rate?—I know nothing to alter it in this Bill.

123. Now I will call your attention to Clause 13, which says, "For the purpose of executing any works under the authority of this Act, the board, and the vestry of any parish, board of works for any district, or other person liable to execute works, may, subject to the provisions of this Act, construct any such works, through, along, over, or under the bed, and soil, and banks, and shores of the River Thames"—You must take that in conjunction with Clause 14.

124. That is one of the very things which was vested in the Thames Conservancy by the Act of 1857; I will come to Clause 14 immediately; that is so, is it not, "Over or under the bed, and soil, and banks, and shores of the River Thames"?—Yes.

125. Now we come to Clause 14, "In order to preserve the navigation of the River Thames" (that over-rides the whole clause), "the plans of any work to be constructed under the authority of this Act through, along, over, or under the bed, or soil, or banks, or shores of the River Thames which may interfere with the free navigation of the said river shall be approved by the Conservators of the River Thames in writing, signed by their secretary, before such works are commenced, certifying that the works, according to such plans, will not interfere with the navigation of the River Thames;" that is so?—Yes.

126. Do you not then by that entirely limit the scope of the rights which we have under the Act of 1857; you treat us not as a Conservancy Board, but as a sort of Commissioners?—I should have thought not.

127. Do not the words of Clause 14 limit them by the words, "in order to preserve the navigation of the River Thames"?—Those are very large words.

128. Is it your intention to limit our rights to the bed, soil, and shores of the River Thames under the Act of 1857?—Not that I am aware of.

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129. I could hardly fancy it was done by accident; then I will call your attention to the saving Clause, 25, which, I presume, is to save the rights of the Conservators of the River Thames, "Nothing in this Act contained shall extend or be construed to extend to prejudice or derogate from the rights of the Conservators of the River Thames, or to prohibit, defeat, alter, or diminish any power, authority or jurisdiction which, at the time of the passing of this Act, the said Conservators did, or might lawfully claim, use, or exercise, so far as such rights, power, authority, or jurisdiction may be exercised for the preserving of the free navigation of the River Thames;" again limiting the saving Clause to the operation of the free navigation of the River Thames; is not that so?—So it appears.

130. Is not that a limitation of the rights which we have under the Act of 1857?—I am not in the position to construe Acts of Parliament; so far as my opinion goes, I should have thought not; I should have thought it preserving the free navigation of the Thames in a very comprehensive form.

131. Do not you think if the words as to limit were left out it would answer the purpose very well?—I cannot express any opinion upon that.

132. I understand you to say, as I understand my learned friend to say, that it is not your intention in any way or kind to derogate from the rights of the Thames Conservators, in reference to the bed, soil and shores of the Thames which are secured to them under the Act of 1857?—I believe not.

## Cross-examined by Mr Littler.

133. I have not much to ask you on behalf of Lambeth; you say the first thing which has operated in this matter has been the removal of old Westminster and old London Bridges?—Yes.

134. I suppose you would call both those public improvements?—Yes.

135. And one was done at the expense of the Corporation of London, out of the Bridge House Estates, and the other at the expense of the Crown Estates?—Yes.

136. And they both had an important effect upon the river?—Yes; they allowed a larger volume of tidal water to pass up the river.

137. Now as to the embankment, the direct effect of the embankment has been to increase the velocity of the current, has it not?—Yes, to some extent; to a slight extent.

138. And to regulate it and make it more even in its velocity?—Yes.

139. Does that show that there is a larger or a smaller volume of water coming up the river?—It does not show either there is a greater velocity, and smaller body; one compensates the other.

140. Is it not a fact that in a river like the Thames the narrowest fixed point will regulate the amount of water that comes up by each tide?—No doubt.

141. Southwark Bridge is the narrowest fixed point?—Yes.

142. How long has the present width of Southwark Bridge continued; since the beginning of this century, has it not?—Yes, many years.

143. Then, that remaining a fixed point, there cannot have been a larger quantity of tidal water brought up unless something else has happened above; can there?—Yes, there may be more from anything that happened above or below; alterations from above and below may cause a greater quantity of water to flow through Southwark Bridge, or a less quantity than has done previously.

144. What was the amount of water space excluded from the river by the embankment?—About 50 acres by the three embankments.

145. Would that have no effect upon the tidal current?—No appreciable effect. Let me put it in this way: supposing there were actually so much more water heaped up in the river, the total tidal volume of one tide up to Trinity high water is 573,000,000 of tons. That 573,000,000 of tons would raise the tide 24 feet; if you could take the water excluded by the embankment, and put it on the top of that again, it would raise it about one-third of an inch.

146. What quantity of water do you make of that; what number of tons?—The quantity displaced I stated to be 587,000 tons.

147. When the land water comes down in large quantities and meets the tide, that is one of the things which you described to-day as one of the causes of floods?—Yes.

148. That is independent of the direction of the wind to a very great extent?—Yes, quite independent of that.

149. To what do you attribute the higher volume of tidal water, if the works on the Thames have had no effect upon it?—I have stated that I attribute it to the north-easterly winds.

150. Is,

150. Is, or is not, the resistance along the shore larger or smaller by the building of the embankment?—Rather less.

151. Has it a tendency to affect the volume coming up?—The resistance being rather less, the velocity is rather increased, but the area through which it passes is reduced.

152. And the velocity being increased, and the time of the tide being lessened, there is more water comes up to a certain extent for that reason?—No, that does not follow; the quantity depends upon the velocity and the area. If you reduce the area, and proportionally increase the velocity, you get the same quantity of water.

153. The low-lying part of Westminster, as I understand, has been very effectually protected by the embankment?—So far as the embankment goes, it has.

154. And with the increase of flooding that there has been of late years, Westminster would have suffered very severely but for the existence of the embankment?—I do not think the part of Westminster where the embankment was formed was flooded; some portion of Westminster was flooded.

155. I do not want to go into legal matters with you, but what are we to understand; is this an amendment of the existing law, or the introduction of fresh law?—I give a very cautious opinion about the law; I am not a lawyer.

156. What is the class of work that you anticipate having to do, because I see that there is a provision here which seems rather to anticipate some extra amount of work. The 11th clause provides that the Board themselves, that is the Metropolitan Board, may themselves execute works; that would be, would it not, something considerable?—That is where the individuals do not do it.

157. "In lieu of requiring any vestry, district board, or other person, under the authority of this Act, to execute any such works as aforesaid, the Board may themselves, if they so think fit, on the expiration of a period of 28 days after notice to that effect has been published once in each of two consecutive weeks in some newspaper circulating in the metropolis, and a copy of the same has been affixed to the principal doors of every church and chapel in the district or parish in which such works are intended to be executed, in the place to which notices are usually affixed, proceed to execute such works." That rather contemplates an extensive work, does not it?—"On the expiration of a period of 28 days after notice to that effect has been published."

158. That contemplates an extensive work, or else you would leave it to the vestries?—No, I apprehend not.

159. It is in lieu of your requiring them to do it?—I do not anticipate any extensive work.

160. Is there any limit whatever on you or the Metropolitan Board as to what you may order under this Act?—No, I apprehend not; we may order what is necessary.

161. You might order the Vestry of Lambeth to complete the Albert Embankment if you thought fit?—That I do not know; we do not propose to do it.

162. I asked what you have the power to do. Is there any estimate prepared by you or anyone as to the amount of work required under this Act?—It would be very difficult to give an estimate; it is patch-work. Pieces here and there required to be done.

163. It makes it a mere matter of detail. I ask whether you or somebody under your supervision has prepared it?—No.

164. Have you no sort of even rough estimate?—I have not added them altogether. I have a pretty good idea of what they are separately.

165. I want to know whether you have any sort of data which would guide us as to the amount of work you think is required under the Act?—No, I have not.

166. Nor can you tell entirely from that how much would be required to be executed by individuals, how much by vestries, and how much by you?—Yes, I can tell exactly how much is required to be executed by each individual; that has been already described to parties along the whole line, each party has been told what is wanted.

167. I understand that, but when this Bill comes into operation there is a certain amount of work which you anticipate will have to be done by individuals?—Yes.

168. A certain amount you are to require the vestries to do, and a certain amount you contemplate doing yourselves?—No, we do not contemplate doing any.

169. What is the use of the 11th section?—I suppose it was considered necessary in case of circumstances requiring it.

170. It is put in at the suggestion of the engineering department?—No.

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171. It is the suggestion of the solicitor's department?—Yes.

172. It is no part of your suggestion?—No, it is not.

173. Now as to the 19th clause, which relates to the same thing: "Where in any parish or district within the limits of this Act, the Board execute any works, they may by order require payment of and recover the whole, or such part as they may think just, of the expenses incurred by them in respect of the same from the vestry of such parish or the board of works for such district; and in any case in which it shall appear to the Board that such expenses have been incurred for the special benefit of any particular part of such parish or district, or have not been incurred for the equal benefit of the whole of such parish or district, they may by order direct the vestry or district board to cause the sum or sums necessary for defraying such expenses or any part thereof to be levied in such part, or exempt any part of such parish or district from the rates, or require a less rate to be levied thereon, as the circumstances of the case may require; and they may, by any such order, direct any such district board to refrain, where any entire parish ought, in their judgment, to be so exempt, from levying any money thereon, and they may, notwithstanding, direct such district board to issue any order or orders for levying sums upon any other parish or parishes in their district." What is the object there, again speaking engineeringly, of providing that a portion of it may be recovered from the vestry; do you think that some of the works executed by the Lambeth Vestry may be of public importance, and, therefore, contributed to by the public?—It might be so.

174. Are there any large works in your contemplation, because we want to know whether this is a temptation to let you pass the Bill?—My idea is that they will be all local works.

175. And you anticipate that the vestry or district will have to pay everything, except what they can recover from private proprietors?—Yes.

176. Have you considered the different depths from the frontage of the river of the different local authorities along the side of the Thames; take Lambeth, which I represent, that runs as far as Croydon; the one my learned friend, Mr. Bidder, represents does not run 500 yards inland?—That is so.

177. Is there any machinery provided by which the people at Croydon shall not have to pay for this local improvement?—That is a matter I have not considered.

178. There is no reason why they should any more than Greenwich and Westminster?—No, perhaps not.

179. Nor perhaps so much?—It may be not.

180. The Albert Embankment, taking the frontage at Westminster, was originally proposed to be carried up along the whole river frontage in the parish of Lambeth, as high as Chelsea, was not it?—I do not remember that.

181. In 1862, was not that so?—I do not remember it.

182. It was intended to be carried far higher than at present?—No, I think not.

183. I suppose you are aware, are you not, that at the present moment there is no obligation at all on a waterside proprietor to raise his bank?—Those are all legal points upon which I would rather not give an opinion; it means the construction of an Act of Parliament.

184. I want to know whether, according to the view you have taken in the preparation of or advising on the Bill as an engineer, you have assumed that the waterside proprietors can be made to pay anything or not?—I have not assumed that; that has nothing to do with engineering.

185. You have only reported on the causes and effects of floods?—I offer no opinion upon those points.

186. Here we have the Thames Embankment Report of the Surrey side, 1862. On the very first page of the report I find, "We humbly submit to your Majesty that an embanked roadway two miles in length should be built between Westminster Bridge and Battersea Park, commencing at the east abutment of Westminster Bridge," and so on?—I do not remember that report.

187. You do not dispute it now that I have reminded you of it?—No.

188. How high up will this jurisdiction of yours extend?—Within the metropolitan area.

189. The whole of the metropolitan area?—Yes.

190. Will that include the mouth of the River Wandle?—Yes.

191. You say you propose to deal with that; do you propose to have embankments all the way along the Wandle, or not?—No; this Bill does not propose to deal with anything but the banks of the River Thames.

192. Then

192. Then will not the effect of embanking the Thames be to drive the water back into the Wandle, and send it back on to the low country?—No. Sir J. Basalgette.

193. What is the height of the banks of the Wandle; are they such as to keep the water out?—The whole of the land on the banks of the Wandle is subject to floods at the present time, and it must be dealt with independently, to prevent it being subject to floods. 8 May 1877.

194. You leave that to take care of itself?—It is a separate question. I have seen the fields all round the Wandle at different times under floods; but it must be dealt with under a totally different arrangement.

195. Do you consider that at the present moment the general embanking of the Thames is as complete as it ought to be, or would you recommend further embankment?—I think there is no necessity for any further embankment at the present time.

196. That is not quite an answer to my question; is there any contemplated at present?—None. I should qualify that by stating that there is a little bit of embankment at Millbank.

197. Do you find that there is any of what is sometimes called crest or crown in the run of water in the centre of the river as it is going up and coming down?—Not in the centre of the river.

198. There is none?—None.

Cross-examined by Mr. Bidder.

199. I think you have told my learned friend Mr. Littler that there is nothing in your Bill to prevent you, if the Board are so advised, from ordering any work, say ordering an extension of an existing embankment?—There is no limit in the Bill, I believe; but the best proof of the reasonableness of the Board's intention is the notices they have already served upon these people of what they think is right to be done.

200. I do not dispute the reasonableness of the Board; but coming to the St. Saviour's district of Southwark, if this Bill were passed in its present form, and if the Board were hereafter so advised, is there anything to prevent you ordering the extension of the Thames Embankment on the south side, and throwing the whole cost of that extension upon the St. Saviour's vestry, so far as they abut upon the river?—The discretion is left, I believe, in the hands of the Board, believing them to be the body best qualified to give an opinion upon that subject consistent with the public good.

201. I do not suggest that they would do anything not right, but the discretion lies with the Metropolitan Board?—The discretion must lie with them; the question is whether the Metropolitan Board are the proper persons to have the discretion.

202. You know that the St. Saviour's district is a comparatively narrow one, and does not extend far back from the river?—Yes.

203. Works done on the banks of the River Thames enure to the benefit of the district behind, as well as St. Saviour's itself?—It will benefit the districts liable to floods, no doubt.

204. Have you made any provision or do you propose to make the districts behind contribute to the cost of doing the works?—I will express no opinion upon that whatever.

205. In your judgment, would it not be equitable that the districts in the background sharing the benefit of the new works, should contribute to their cost?—I think it would be quite fair that the districts protected from floods should contribute to the cost.

206. That the entire cost should not be thrown upon the district which happened to be a frontager?—Those who are protected from overflow by the banks are those benefited.

207. One question upon the 12th Clause of your Bill: The 12th Clause provides that "any person liable to execute works within the limits of this Act, and required by any general or special order, or any notice under the authority of this Act to execute any works, may for the purpose of executing such works, and the Board, the vestry of any parish, and the board of works for any district may for the purpose of executing any works under the authority of this Act enter upon, take and use any lands or streets which he or they may require for the purpose of executing such works or giving effect to the provisions of this Act." That is to say, any lands or streets not brought before Parliament, and as to which of course they have no opportunity of being heard. In the whole

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course of your experience, do you know any single instance in which Parliament has ever given to any person, company or body, a roving power to take land compulsorily, when they so choose, at their good pleasure?—Certainly, I do the same powers have been given to the Metropolitan Board of Works with reference to the main drainage; no plans were deposited; the Board have had full power and have exercised the power of taking what land they thought necessary to carry out the main drainage works.

208. Was not it a power to take easements under lands?—No, to take land. The northern outfall sewer has taken a large tract of land all the way from Bow Creek down to Barking.

209. Surely before you went for your northern embankment you deposited plans?—No.

210. Not for the Victoria Embankment?—No, that is where you are mistaken; it is precisely the same power that is asked here; that is a very good illustration.

211. The effect of the clause would be that either the Board or the district board, or the vestry, or the persons ordered to do the works, might in his or their discretion take private lands or public streets?—No doubt; the Act is framed upon the assumption that the Metropolitan Board of Works are the proper body to do these works in a proper way.

212. There would be no right of appeal for any owner who thought you were not justified in taking his land; he would have no opportunity of being heard?—An opportunity of being heard certainly.

213. I have your Act in my hand now, and this section is pointed out; you say there were no plans; the first thing which catches my eye is Section 5 of the Act; this is the Thames Embankment Act, 25th and 26th Victoria?—I was talking of the Main Drainage Act.

214. You said that in the case of your northern embankment you had no plans?—No; I was speaking of the Metropolis Main Drainage Act.

215. I asked you as to the Victoria Embankment?—You were talking to me about the Main Drainage I thought. It was a misunderstanding.

216. You now recollect that as regards the Victoria Embankment, there were plans and sections showing the land that you proposed to take?—Yes; the Metropolitan Board of Works did not go to Parliament for the Victoria Embankment; a Royal Commission went to Parliament for that embankment.

217. I have not before me the Main Drainage Act, but were not the lands that you were authorised to take, referenced?—No.

218. Had you in that Act any power such as you now seek in this Bill, to delegate the right to take land to district boards, or vestries, or persons?—I do not know whether we had or not.

219. I see, as regards the question of contribution, where several parishes are jointly interested in the work, as regards the question of contribution from the Metropolitan Board, where they may be considered on behalf of the Metropolis generally interested, the question of apportionment by the Bill is left absolutely in the hands of the Board?—Yes.

220. But there is no appeal from any decision of theirs?—I presume so.

221. They would be judges between themselves and the parishes as to what it was just they should pay, and what it was just that the parishes should pay?—Yes, they are the judges in the matter.

222. And there would be no appeal?—No.

223. You referred me to the Main Drainage Act; I have put into my hand the Metropolis Local Management Act, 18th and 19th Victoria, and I find this clause in it: "Before the Metropolitan Board of Works commence any sewers and works for preventing the sewage from passing into the Thames as aforesaid, the plan of the intended sewers and works for the purpose aforesaid, together with an estimate of the cost of carrying the same into execution, shall be submitted by such Board to the Commissioners of Her Majesty's Works and Public Buildings; and no such plan shall be carried into effect until the same has been approved by such Commissioners;" you propose no analogous provision in the present Bill?—I think we do.

224-5. You submit your plans to nobody except the Conservators of the River Thames?—That clause must have been repealed subsequently, because we do not submit plans; it was repealed in the next Act. However, as a matter of fact we do not submit plans.

Wednesday, 9th May 1877.

MEMBERS PRESENT :

Mr. Ashley.  
Mr. Grant Duff.  
Sir George Elliot.  
Mr. Gordon.  
Mr. Hick.  
Sir James M'Garel-Hogg.

Mr. Locke.  
Sir Andrew Lusk.  
Mr. Mark Stewart.  
Mr. Watney.  
Mr. Wilson.

MOUNTSTUART E. GRANT DUFF, Esq., IN THE CHAIR.

Sir *Joseph Bazalgette*, re-called ; and further Cross-examined by Mr. *Little*.

26. I was taken by surprise by your saying that you did not remember what took place before the Royal Commission of 1862 ; I have here your evidence of the 11th of June 1863 upon the same point, before a Select Committee on the Thames Embankment (South Side) Bill ; I see, at page 2, first you say, " The objects of the Bill are twofold ; I think to improve the sanitary condition of the district by keeping out the inundation ; and secondly, to provide a better mode of communication towards Westminster Bridge and the parts towards the City ;" and then the Committee ask you, at Question 26, " In your departure from the line recommended by the Royal Commissioners have you had in view the object of saving expense as much as possible ?—(A.) Yes. (Q.) Knowing that you had to deal with a limited amount of funds ?—(A.) Yes. (Q.) Probably, if you had an unlimited amount of funds, you would have adopted more of their plan ?—(A.) No doubt, if there were unlimited funds it would be desirable to continue that line ;" so that in 1863 you had before your mind the Report of the Royal Commission of 1862 ?—So it appears.

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Further Cross-examined by Mr. *Bidder*.

227. I left off yesterday upon the question as to the compulsory powers that you take under Section 12 of your Bill ; you gave the Committee to understand that the protective works which were necessary to prevent a repetition of the floods which recently occurred are of a comparatively unimportant character ?—

228. That what was principally wanted is a general controlling or supervising power to compel frontagers to do what is necessary ?—Yes.

229. You said a few pounds spent in bricks and mortar, or in logs of timber, or what not, would have saved many thousands of pounds damage ?—Yes.

230. I think the section of the river banks, which you showed the Committee yesterday, indicated, so far as they could, the character of the works, that they are small, isolated works at different spots along the river, where the banks require to be raised one or two feet, as the case may be ?—That is generally the character of the works.

231. That being so, will you tell me why for that purpose, if all that is wanted is a supervising power to make each frontager do his duty, you want these extraordinary powers of compulsorily taking the lands wherever you please, which we find in Clause 12 of the Bill ?—To provide for any contingency that may arise.

232. Will you try to imagine a contingency to be met by that clause ?—It may be necessary to encroach upon some lands for the formation of the works.

233. Take your own sections and point out any case which affords any shadow of justification for taking general powers for the compulsory taking of lands and



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stopping up of streets; that is what Clause 12 proposes to do; assuming it is conceded that you are to have a supervising control, and have a power as a central body making everybody do their duty, so that the neighbourhood shall not suffer through the obstinacy of any individual; assuming all that conceded to you, will you agree that there is no possible case where there is a justification for the extraordinary power in Clause 12 of the Bill?—It is impossible for me to fancy cases without carefully looking into the matter, but I can conceive that in the course of the works that will have to be done such cases may arise.

234. I may assume that the engineers of the Metropolitan Board of Works have looked into the matter very carefully?—Not into the detail of each case.

235. You looked into it so carefully that you have dealt with each individual case, and have sent out 800 letters of requisition; that looks as if you had gone into the matter with considerable detail?—Not with very considerable detail. I have gone into the matter to this extent; I have ascertained the height by careful levelling of all the existing wharves, and I have ascertained how much they are below five feet above Trinity high-water mark, and I have called upon them, or at least the Board of Works have called upon them to raise their wharves to that level; to that extent the matter has been looked into; but if the Board should hereafter themselves construct works, those works would have to be considered in very much greater detail.

236. May I assume that you as the engineer of the Metropolitan Board of Works, in sending out the 800 letters of requisition, dealt with everything which you considered necessary to be done in order to prevent a repetition of the floods?—Yes, to the extent which I have already described.

237. May I assume that if those letters of requisition had been complied with, the neighbourhood upon both sides of the river would have been protected from a repetition of the floods?—Yes.

238. Is there a single one of the instances in which it is necessary for the Metropolitan Board of Works or a district board to have compulsory powers for taking land?—That is a question that I have not sufficiently considered to enable me now to answer.

239. So far as you are aware, is there one?—I have not looked into the cases with that detail to enable me to form an opinion.

240. So far as you as engineer of the Board are concerned, you can point to no cases in which the compulsory power of taking land is required?—I should require much more careful consideration before I could speak to the details of any of those works.

241. Did you make a report to the Board of Works before this Bill was determined upon last year?—I made the report which I read yesterday.

242. Did you make a report to the Metropolitan Board of Works last year, in which you recommended three alternative ways of dealing with the question?—I do not remember that.

243. Did you recommend, amongst other things, to the Board, as a way of dealing with the question, that embankments on both sides of the river should be continued at very large cost?—No.

244. You did not recommend, as one way of dealing with the question, the construction of new embankments, or continuation of the present embankments?—I did not.

245. Then I am misinformed; did you make more than one report last year on this subject?—I think I did; I think I know the report to which you are alluding at this moment, which was a report recommending that this matter should be dealt with in the way in which it is now proposed to deal with it, and pointing out that, if dealt with by embankments along the line of the river, a large and unnecessary expenditure would be involved, a large and unnecessary interference with private rights, and a destruction of the trade of London; and I strongly recommended that such a course should not be adopted.

246. Have you got that report?—I have not.

247. I suppose it could be obtained; it is in the archives of the Board of Works?—Of course it is. I am not sure whether it is a report to a committee or a report to the Board.

248. Do you represent to the Committee that, in your opinion, the construction of the embankments already made by the Board of Works has not aggravated the flood effects?—I do.

249. You

249. You told the Committee yesterday, and no doubt with considerable accuracy, that anything in the course of the river in the way of unevenness or obstruction, tended to prevent the tidal flow?—Yes. Sir J. Bazalgette.  
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250. Is not a correct representation of what has been done by you, to say that by the construction of your embankments, especially the Victoria Embankment, you have trained all the river, removed a large quantity of lateral obstruction, and given straight perpendiculars to the river which trains the tide, and assists it in its progress up the river?—Yes.

251. Is not the effect of that to increase the quantity of water that will pass up it?—No, the effect is to increase the velocity, but decrease the volume; and one compensates the other.

252. What you mean is this, that the embankment has had two effects, one to increase the velocity, which of course, if acting by itself, would mean to send more water up the river, and another effect to decrease the sectional area?—That answer must be taken to have reference only to that portion of the river exactly opposite to the embankments.

253. Take that portion of the river by Charing Cross and Waterloo Bridges; the effect of your works has been to increase the velocity of the tide past that spot?—It has gradually increased the velocity of the flow in proportion as it has decreased the volume.

254. How has it decreased the volume?—Because it is in a narrower channel.

255. I was not incorrectly representing your view in saying in your judgment it has increased the flow, and that that effect has been compensated for by diminishing the area through which it flows?—Yes.

256. Let me ask you as bearing upon that, whether, when you designed the Victoria Embankment, you designed it with reference to all past experience as to tides?—Yes.

257. May I presume that you made what you considered very necessary provision against its being flooded?—Yes.

258. You made your openings at such a level as you considered sufficiently high?—Yes.

259. Am I right in this, that since it has been completed recent experience of tides that have occurred since the embankment has been completed has shown you that the tides now rise higher, and subject the embankment to more risk of flooding than you had reason to anticipate at the time you made the work?—We have had one tide rising six inches higher than any previous tide.

260. In point of fact, you have had to make works lately which we can see down the embankment raising the barriers against the water six or eight inches?—That has been done.

261. So that the height which you thought sufficient to keep out the water, judging from past experience, now proves to be insufficient?—It has not been insufficient hitherto, but it may be; as a matter of precaution we have raised it six inches higher.

262. Experience since the embankment has been constructed shows you that that which you thought, founding upon past experience, was sufficient, is insufficient?—We have raised it.

263. Let me go to another matter, going further back in the history; you told us yesterday when Old London Bridge was taken down?—It was completely removed in 1834.

264. You explained to the Committee yesterday that the water-way through Old London Bridge was not more than somewhere about one-third of the water-way through the present bridge?—Yes.

265. And Old London Bridge had existed for about eight centuries?—It was completed in 1209.

266. It had existed six centuries?—Yes.

267. That bridge acted to some extent as a dam to the tide water?—It did.

268. And there is no doubt whatever that the removal of that bridge, and the substitution of the new bridge, enormously increased the quantity of tide water that would come above it?—Not enormously increased.

269. Very seriously?—I read the report to you yesterday, in which it was estimated by the then surveyors that it would be about six inches.

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270. We will not trouble you about the estimate of the then surveyor, because he has been dead long ago, and we have 50 years' experience since. I will ask you as to the facts?—I gave all the facts yesterday. You will find them in my evidence. The facts are that between the years 1823 and 1845, according to the best observations that have been taken, there has been a total increase of  $14\frac{1}{2}$  inches in the average rise of the high water; that is due to the removal of London Bridge and other obstructions, and the deepening of the channel, and the increase of the tidal volume,

271. I will take it for the present at  $14\frac{1}{2}$  inches. I do not know what the scale of the section that you have put upon the wall to-day is, but that shows very conveniently, and in a general form the height of high water in 1823 and in 1845, and Trinity high water for comparison?—It does.

272. What is the scale of it?—One inch to a foot; it is a distorted scale, of course.

273. That substitution of New London Bridge for Old London Bridge was a great improvement?—Yes.

274. You say it was a great improvement to the navigation of the Thames. In point of fact navigation was almost impossible through the bridge before?—Navigation was possible, but it was not so good as it is now.

275. It was found to be a great metropolitan improvement, as giving a better access between the north and south sides of the river?—No doubt.

276. So that it is not unfair to say that to a great extent the present liability of the upper districts to flooding is a consequence of that which was done in 1834, for the purposes of a general metropolitan improvement?—That is so to some extent, no doubt.

277. That being so, and the districts being subjected to flooding by a work which was done as a great metropolitan improvement, is it equitable, in your judgment, that the cost of protecting themselves against that liability to flooding should be thrown upon themselves, and the immediate frontage districts, instead of upon the metropolis generally?—I do not see why it should be thrown upon the metropolis generally. The districts upon the water side are those which derive benefit from being upon the water side, and they are the districts affected by the works; and the districts at a distance are not in any way affected by the floods.

278. Do you mean that Vauxhall and Lambeth are not and never have been affected by the floods, when they are knee-deep in them?—I mean that all districts situated below the level of five feet above Trinity high-water mark may be subjected to floods.

279. If they have been subjected to that liability in order to construct a work which is a great boon to the metropolis generally, and no boon to them, is it not just that the metropolis generally should protect them from the consequences of that work?—No, I think not.

280. You know the district I represent, St. Saviour's, Southwark; it extends from London Bridge up to Blackfriars Bridge on the south side, and a little beyond Blackfriars Bridge?—Yes.

281. The first great river work which the Board constructed was the Victoria Embankment?—Yes.

282. What was the cost of that in round numbers?—I am afraid I cannot answer you off-hand.

283. It was counted in millions, was not it?—I do not like to mention the figure, as I do not remember.

284. Perhaps you can give it afterwards?—Yes.

285. It was counted in millions, whatever it was; we paid a part of the cost of that embankment?—Yes.

286. Did you do us any good?—Yes.

287. What good did it do to St. Saviour's?—One of the main objects of constructing the embankment was the formation of the low level intercepting sewer.

288. What good did the low level intercepting sewer on the north of the river do St. Saviour's, Southwark, on the south of the river?—It diverted the sewage of the Thames.

289. Did

289. Did you take the sewage of the south side over to that low level intercepting sewer?—Certainly not. Sir J. Bazalgette.

290. It is clear that that is a mistake upon your part; it was no good to us?—I do not admit that. I say it was good to you. 9 May 1877.

291. You mean that we, in common with the rest of the metropolis, participated in the benefit of having the sewage removed from the river?—That was one benefit, and another was a great metropolitan thoroughfare; another benefit which you derived was open spaces for air and recreation.

292. That is not much good to us down in Southwark?—I think it is.

293. Those were advantages principally enjoyed by residents in Westminster, Whitehall, and those neighbourhoods?—And probably by the people in Southwark, too, and all persons in London.

294. All persons in London who choose to go there, or out of London?—Yes, when they come into London.

295. The next great work was the Albert Embankment?—Yes.

296. We contributed to that?—Yes.

297. That also was reckoned in millions, was not it?—Yes.

298. Did we get any good by the Albert Embankment?—Yes; the Albert Embankment forms an important link in the main thoroughfare from London Bridge Station, right away to the south-west of London. I see in one of the petitions the cost of the embankment—

299. That is only estimated cost, but that is a very slender guide to the exact cost?—It is not far wrong.

300. We had better leave it until you can give the actual figures; in the Albert Embankment we have the privilege, in common with the other members of the public, of enjoying the thoroughfare, but what special advantage was it to the district of St. Saviour's, Southwark?—It was just the same advantage to Southwark, and it was as right to charge Southwark their share of it as to charge the rest of the public with the formation of the new Southwark-street; they were both large and important thoroughfares to which the whole of the public contributed. Southwark has had quite its share of public improvements of that character in its immediate neighbourhood; and therefore it is reasonable that it should contribute to the works of a like nature in other parts of the metropolis.

301. I think I am not wrong in saying that that embankment had the effect of protecting the district behind it from being flooded?—It had.

302. That was the district behind the Albert Embankment in Lambeth, which, until the embankment was made, was liable to flooding?—Yes.

303. That embankment was constructed a good deal in consequence of pressure from the Lambeth district, arguing that as you had done the work for the benefit of the north side of the river, and they were suffering from floods, you ought to do a work for their benefit?—No doubt that was an argument made use in favour of it.

304. It was an embankment which, beyond conferring a general advantage upon the metropolis at large, conferred a special advantage upon the Lambeth district, that it protected them from flooding over their own frontage?—Yes, it did.

305. You did not upon that occasion charge them with any extra share of the cost?—On the contrary, the property was all bought up and destroyed.

306. And they not only were not charged, but they got handsome compensation?—There was nothing left to charge.

307. There was the whole parish of Lambeth?—The whole of the property upon the river was pulled down, and the spaces utilised for the public.

308. Your proposition is not to put the cost of the work upon the property actually upon the river, but upon the parish behind; it is true that you brought up the frontage, but you left the parish behind, which before that had been more or less subject to flooding, and yet in that case I was right in saying you did not throw any special charge upon them, did you?—No; they contributed to it.

309. So that, on the contrary, we in St. Saviour's who, as far as flooding was concerned, were by no means benefited, helped to pay the cost of protecting Lambeth from the floods, by the construction of that embankment?—It was an advantage gained by those behind the embankment.

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310. That

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310. That being so, will you tell me why Lambeth and the other districts should not help to defray the cost of protecting us from floods?—That was merely incidental to a great public work; that work was not done to protect them from floods.

311. If you made the embankment down at Southwark it would protect us from floods?—If an embankment at Southwark were made it would be simply to protect you from floods, having no other public advantages attached to it.

312. The last work you did was the Chelsea Embankment, on the north side of the river?—Yes.

313. That, though not quite so expensive as the others, has been a very costly work also?—Yes.

314. That hardly runs into millions?—No.

315. Did we get any benefit from the Chelsea Embankment?—Yes.

316. What benefit do the people living in St. Saviour's, Southwark, get from the Chelsea Embankment?—The same as the Chelsea people got from the construction of your Southwark-street.

317. Streets have been made all over London?—This is a great street on the Chelsea Embankment, and it is an important wide thoroughfare from one end to the other.

318. Do you suggest that the Chelsea Embankment is any earthly advantage to people living something like three miles off, in St. Saviour's, Southwark, on the opposite side of the river?—I can only repeat the answer, that they have contributed to your streets, and they have the advantage of walking along it, if they please.

319. You propose to complete the gap on the north side of the river, between the Houses of Parliament and the Chelsea Embankment?—Yes.

320. What is to be the cost of that work?—I cannot tell you off-hand.

321. Is it counted in millions also?—No.

322. One million will be enough?—No, I think under a million.

323. Are we to have the honour of contributing to the cost of that work?—I expect you will have to do so; it is a work of a like character, therefore I think you ought to do so; all those are metropolitan improvements.

324. Your principle is, that if a work rises to such magnitude as to be grand or sublime, whether we are near it or far off, we have the honour of paying part of it, but if it is a small and economical work we are to do it ourselves?—That is not exactly the way I should put it. I should say, if it is a work of a metropolitan character, a metropolitan improvement, it ought to be charged over the metropolis; if it is a work of a local character, then it should be charged upon the locality. That is the principle adopted in the formation of streets and thoroughfares generally.

325. If in the course of the construction of the work you do any individual damage, all the necessary compensation must be borne by the metropolis?—All compensations in connection with a metropolitan work must be borne by the metropolis.

326. All the compensations necessary in a great metropolitan work must be borne by the metropolis; but that does not apply to the case of Old London Bridge, which has caused such serious flooding?—I cannot form any opinion about Old London Bridge.

327. As to the proposed embankment between the Houses of Parliament and Chelsea, will that protect certain low-lying properties and districts along the river, which are at present subject to flooding?—I think there are some houses facing it, just in front of it, that are liable to floods.

328. Millbank, and along there?—Yes; it does not go to any extent, but the houses facing it are liable to floods; the embankment is not necessary to protect them from flooding, because the formation of the roadway, if there were no embankment, would have that effect.

329. Can you throw any light upon the letter read at Question 73 in the evidence yesterday; it is a letter sent out to all the owners. "The Board's engineer has been considering the best way of applying an effectual and prompt remedy, in the absence of any orders or plans, for a complete system of protection against inundations"?—Yes.

330. May

330. May I gather from that that you contemplate plans for a future complete system of protection against inundations?—No. Sir J. Basalgette.

331. What is the meaning of this: "In the absence of any orders or plans for a complete system of protection"?—The meaning is that there is no complete and comprehensive plan, and therefore each case must be looked into in detail. 9 May 1877.

332. That has not, as one may gather from the language, any reference to a future complete system or plan; such a plan was contemplated, was it not?—No.

333. Not by the Board?—No.

334. Nor their officials?—No.

335. Nor discussed?—It was discussed.

336. At one time it was contemplated as a possible way of dealing with the question?—It was considered, and the disadvantages attending it were so great that it never was entertained.

337. What were the disadvantages attending it?—The disadvantages are, first, that it would destroy the wharf property and trade of London; and besides doing that damage to the trade of London, it would be enormously costly; then there is no adequate advantage to be gained by it.

338. You would get, as you have been pointing out in the case of the Albert and Victoria Embankments, the inestimable advantage of a great thoroughfare?—No, you would have no advantage of a great thoroughfare there; the great thoroughfare was formed. If you look at Nine Elms Station and carry your eye across to London Bridge, the great thoroughfare was formed by the new street made through Southwark to London Bridge in a direct line. If the road were formed round the edge of the river, it would be a circuitous way of going from one point to the other.

339. You are aware that if at any time the opinion of the Board should alter, and it should be considered, notwithstanding the cost, that it is expedient to do it; if Parliament sanction this Bill, you might do it without submitting any plans to anybody, though it might cost millions, and rate the metropolis to do it?—I suppose it would be so.

340. If Parliament passes this Bill you might at any time hereafter, without a word to anybody or submitting a plan to any mortal soul except the Thames Conservancy, embark upon a work costing four or five millions; rating the metropolis to pay for it?—Now you have gone a great deal too far for me. I do not admit that at all.

341. Will you take your Bill and show me anything in it preventing you?—No, I do not propose to interpret the Bill, but so far as I understand, there is no such arbitrary power as that sought in the Bill. I can now give an estimate of the cost of the embankment. The total cost of the Victoria Embankment was 1,249,619 £., upon which there was to be a return for lands; a recoupment. The total cost of the Albert Embankment was 1,020,000 £., upon which also there was to be a recoupment. The cost of the Chelsea Embankment was 337,000 £., upon which there was also to be a recoupment for lands.

Cross-examined by Mr. Philbrick.

342. With regard to these gentlemen who are Petitioners, Messrs. Elmslie & Company, their wharves lie chiefly in the districts which my learned friend, Mr. Bidder, represents, Southwark, between London Bridge and Southwark Bridge?—There are wharfingers all along Southwark, Lambeth, Wapping, and along the populated parts of the river.

343. These petitioners are chiefly in that part of the river, Southwark; the map that you showed the Committee yesterday showed that a large portion of Southwark and a large portion of Lambeth was subject to flood at high water, unless the river was kept out?—Yes.

344. The only protection that has existed has been such works as these riparian proprietors have constructed in the building of their warehouses and wharves?—Where wharf property exists, those have been the barriers to the tide.

345. The only barriers?—Yes; then in other places you have roads, and in

Sir J. Bazalgette. other places where they did not exist, raised banks. The character of the banks varies according to the state of the property.

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346. They are either private banks or private buildings and wharves, except in the case of public roads?—Public roads, or draw-docks.

347. And they are not a very considerable proportion of the river frontage?—No.

348. With regard to the floodable district behind these properties, they have not contributed in anyway, though they have incidentally derived benefit from the works?—Contributed to what.

349. Contributed to the expense of keeping out the water?—If you allude to the expense of these works, or the construction of the business premises upon the margin of the river, of course they have not contributed to the construction of those premises.

350. Primarily, of course, the object of a landowner, wharfinger, or warehouseman, has been the carrying on of his business, and in so doing he is incidentally conferring a benefit upon his neighbours behind to that extent?—Yes.

351. For which he has neither been paid nor has sought to be paid any contribution?—No.

352. When a wharf or warehouse is reconstructed, the plans of the warehouse or building are submitted to the district surveyor, are they not, or to the district authorities?—No, I think not.

353. Are they submitted to the metropolitan authority, the Board of Works?—I do not think they are submitted to either, as regards the construction of the building.

354. As regards the height of the building, and its height above the water-line, and so forth, is not that shown in plans submitted to the authorities?—I think not, but I do not speak positively upon that point.

355. At all events, you can tell the Committee this, whether there has been on the part of the Metropolitan Board of Works, or to your knowledge on the part of the district boards, or surveyors, any limitation or orders to the proprietors of wharves and river-side property, as to the level or height to which they were to raise their property, or to which they were to make their openings?—There are no such plans submitted to the Metropolitan Board of Works, and therefore the matter has not come under their cognizance.

356. Therefore the proprietor, as far as the Metropolitan Board of Works is concerned, is left to construct and maintain his business premises in the manner which suits him best, having due regard to the rights of his neighbours?—Yes.

357. Like any other ordinary owner of property?—I believe so.

358. You know that the property is immensely valuable, and very large sums of money have been expended, more particularly in late years, upon the improvement and reconstruction of the property?—Yes.

359. The wharves above London Bridge represent value that might be counted by millions?—Yes.

360. Is there any reason to suppose from such surveys as you have made, that these gentlemen, the owners, are not perfectly capable of reconstructing their premises, and conducting their business, to the best advantage for the requirements of their business?—For the requirements of their business no doubt they do, but for the exclusion of the floods, they do not.

361. Then if the requirements of their business admit of the incursion of the tide, having due regard to their business, and you want to keep out the tide for the benefit of the people behind, is it just that these wharfingers and owners of property should bear the cost of it?—If you ask me, I think it is.

362. Why?—Because they derive benefit from their position on the banks of the river; they have large sources of income, and I think it is only reasonable that they should so construct their wharves as to exclude the tide from overflowing them.

363. Supposing their view is that their premises, as at present constructed, answer all their requirements, why should they be forced to improve them to meet your view of what their requirement is, at their own expense?—That is not an unreasonable obligation to impose upon them.

364. If they are able to conduct the commerce of the world (and a large portion



portion of it comes up to these wharves), why should their premises be improved against their will, and against their practice at their own expense?—My individual opinion is this, that if they enjoy the advantage of being upon the river, and derive great wealth from the river, it is not an unreasonable obligation to expect them so to construct their wharves as to keep the water from overflowing.

365. If that be so, your principle would be to put upon every proprietor of the water line the duty of keeping the water out, so that it should not make an incursion upon the property behind?—That is a point upon which I give a very hesitating opinion; that is a matter for you gentlemen to discuss, independently of me; it is not an engineering question, and my opinion will have very little weight with you.

366. I accept the position of humility you assume, in the way you assume it; now as to the engineering questions, there was a long moving panorama displayed before the Committee yesterday, but there is no general plan applicable to the whole of this valuable property along the river, in your mind?—No.

367. When I turn to your report addressed to the Metropolitan Board, of the 4th of January up to the present year, I find you say, "there is, however, a class of property more difficult to deal with, namely, those wharves where the main floors and sills of the doors or loopholes are below the level of extraordinary high tides"?—Yes.

368. You seem to propose a system of shifting doors which would exclude the water?—Yes.

369. Is that all you propose in this Bill; all that you take power to do as to this property?—Certainly not.

370. Then that report conveys only a temporary expedient?—The portion of the report that you have read; it is not a temporary expedient, but under proper regulations it will be a permanent expedient; it deals with every case, dealing with each case in a different manner according to its necessity.

371. As the Report is in print, I do not want to employ time by going over this matter needlessly before the Committee, but as to this class of property, and these valuable wharves, what do you really mean to force the owners to do, if you pass your Bill?—In those particular cases of walls, which have loop-holes, which are the only apertures through which the tide is allowed to pass inland, I propose simply to have such slides as I have described, fixed and maintained under proper regulations, provided all other things upon those wharves were right, supposing the wall itself is sound and water-tight, which some are not.

372. Do you propose, and is it part of your view, that the owners of these wharves, or the occupiers, should be compelled to do the works which you think requisite, at their own expense?—That is not contemplated by the Bill.

373. What is contemplated by the Bill?—I do not know that I should like to give an opinion as to how it is to be paid; it is a point that you can determine by reading the Bill itself.

374. Supposing these works that you contemplate were to be executed at whosoever's expense, and suppose in the course of executing them some further works are required to bring about such a state of things as you would be satisfied with, what is to happen to the business of the wharf during the time of constructing the works?—The works we have been talking of now would not interfere with the business of the wharves at all.

375. Do you contemplate taking power to do any works which would interfere with the conduct of the business of the wharves?—Possibly to some extent.

376. Who is to pay for them, the wharfinger; because, as it stands, he has to bear it, and he has no remedy?—I think he should not be paid for it.

377. That is to say that you propose that he should bear the loss which the stoppage of the whole or a portion of his business may entail upon him, by reason of the construction of the works that you take power to do?—Whatever that amount of inconvenience may be, two-fifths of those wharfingers have already taken upon themselves that inconvenience, and have executed the works at their own cost; I do not think any further proof could be needed to show that no great hardship is proposed to be imposed upon them.

378. I can quite understand that it may be a strong argument in favour of your view, assuming that you limit the works to be done to each wharfinger, but

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I understand you want further powers; if you can give me a pledge that it is not to go beyond it, I can understand you?—All we want is power to do the necessary works, whatever they may be.

379. Suppose the doing of these necessary works entails stoppage, wholly or partially, of our business, who is to bear the loss?—In the first place, it need not entail stoppage wholly.

380. Then you dispute my assumption; I will not discuss it, but I ask you to make that assumption?—It may, and will no doubt entail some little interruption to business, and I think the wharfinger, whoever he may be, may fairly be asked to submit to that interruption.

381. You put him in this position; he has made works which have conferred benefit on his neighbour behind him, which his neighbour gets the benefit of without paying a farthing, and you are going to require him to do more, and make him pay such damage as he may sustain, as well as the cost of the works; is that your view of what ought to be done?—I think it would not be unreasonable, though I do not say the Bill contemplates that.

382. Have you not in those requisitions suggested that certain quays should be raised bodily in localities where the water of the Thames never flooded the quays?—No.

383. You intentionally limit your suggestions or requirements to cases where the floods have come over?—I say no; for this reason, you have had a tide which has risen to a height of four feet six inches above Trinity high water-mark, and all we ask is that those who have wharves below five feet above Trinity shall raise them to five feet, so that it is possible there may be some wharves which within the six inches may not have been flooded, and we ask the owners to raise them six inches.

384. As to some of the gentlemen to whom you refer as coming within the three-fifths who have not carried out the suggestion, the water has never come on their premises at all?—I say it may be so within the limits I have described.

385. I see you have a very large stretch of the Thames there, on the map before the Committee; going down the river a little way, does that show the limit of the metropolis showing the jurisdiction of the Board of Works?—Yes. The dotted line does so.

386. The red vertical line, just above the "M" in Thames?—Yes.

387. If I take from the word "Crossness" and go to that point just above 20 miles, there is a river wall, is there not?—Yes.

388. Which keeps out the Thames from the district behind?—Yes.

389. That is a continuation, is it not, of a very long wall, and series of works under the jurisdiction of the old Commissions of Sewers, extending from Lombards Wall, which is within the metropolitan area, a long way down the river, so that part of the defences is within and part without the metropolitan boundary?—That I cannot speak to.

390. You know Lombards Wall over which your jurisdiction extends is more within your metropolitan boundary?—I do not know that.

391. I will just call your attention to this, that from Lombards Wall down the river as far as that Commissions of Sewers extends is all one jurisdiction, and it is practically one set of defences on different levels; do not you know that?—I do not know anything about that.

392. Just let me ask you this, although the parishes and district boards take power under the Metropolitan Act to make and maintain works and defences and banks; how do you manage as to that which is part of an integral system, only part of which is within your jurisdiction and part beyond it?—That I cannot answer you off-hand. I know this, that the Commissions of Sewers to which you refer serve notices upon the owners themselves and require them to raise their walls, and they have done so. It is probable that we have not interfered with that.

393. You are right, you have not touched it, although it comes within the metropolitan area. But now let me call the attention of the Committee to this through you: With regard to lands protected by sea walls in the inner level, the principle of taxation is upon the acreage benefited by the works that keep out the water?—I know nothing about that Act. I cannot tell you.

394. That is their general principle. Were you concerned, acting professionally for the Greek-street Commission of Sewers, which had some works of this kind under their jurisdiction?—No, on the contrary I think what was done by

by them, and what was done formerly by some of the Commissions of Sewers below, was to serve notices upon parties to raise their banks, and do the necessary works themselves.

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395. That is where the parties are liable themselves; but where the Commissions do it, they do it at the expense of the level, and levy a wall scot?—I cannot answer that.

Cross-examined by Mr. Williams.

396. Did you give evidence before the Select Committee in 1863 on the Thames Embankment (South Side) Bill?—I did.

397. Were you then of opinion that the construction of the works on the south side would have the effect of preventing inundations at Lambeth?—To the extent, no doubt, to which they went.

398. That was, in your evidence, one of the objects of the scheme?—One of the advantages of it, no doubt.

399. You were asked this question: "Another object was the keeping out the high tides which now overflow the lower levels in Lambeth." Your answer was, "Yes." Then there is this: "We know very well that the overflow constantly produces a great deal of disease, fever, and so on. Yes, it is very injurious." I suppose you are of opinion now as you were then, that the construction of an embankment is an excellent mode of preventing inundations?—In that case.

400. That is your general opinion, is it not?—No, I say not; as regards the cost, it would be a very bad plan indeed as regards the district we are dealing with.

401. For the purpose of keeping out inundation, the embankment is as good a work as you can construct?—Not such an embankment as you and I are speaking of.

402. I ask a general question, is not the embankment for the purpose of keeping out inundations as good a work as you could construct?—No, not put in that general way.

403. What is better?—Putting in slides, where you have wharf property such as I have been describing, and various other works as applied to each different locality.

404. Do you not resort to those means when it is not desirable, on the ground of expense, to construct an embankment?—No, I resort to those means when they are most suitable for the locality.

405. You prefer those means to making an embankment?—I do in those cases.

406. The result of that Committee was that an Act was passed for the construction of the embankment?—It was.

407. You have told my learned friend that the Metropolitan Board of Works are now proposing a Bill for a continuation of the embankment by Millbank, is that so?—Yes.

408. Did you make a report to the Board of Works about that Bill?—Yes.

409. In what year?—It is part of the street improvement.

410. I believe that the works proposed to be constructed under that Bill are to be paid for by the Metropolitan Board of Works?—By the metropolis at large.

411. In your report to the Metropolitan Board of Works, with reference to the Millbank Bill now before Parliament, did you say this: "There is at present a break in the line of thoroughfare, as well as of the embankment, between Millbank Penitentiary and the Houses of Parliament, and it is the object of the projected improvement to remedy this defect by completing the embankment and forming a wide roadway between those points; that improvement will have the further effect of protecting the neighbourhood from the floods from which it has so frequently suffered on the occasion of high tides;" you stated that in your report?—Yes.

412. You are aware that in the Bill now before the Committee, in the Interpretation Clause, the word "bank" is defined?—I do not say so.

413. I ask whether you know it?—I have not looked at the Bill with that object.

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414. Have

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414. Have you not read the Bill?—I have read the Bill, but not with respect to the Interpretation Clauses.

415. Perhaps you will understand me better if you will look at the first section of the Bill; the first section gives the definition of the word bank, amongst other things, and it says, "The expression 'bank' includes any bank, wall, fence, wharf, dock, or defence for the protection of lands within the limits of this Act from floods or inundations caused by the overflow of the River Thames;" and then there is a further definition, "The expression 'works' includes the entire or partial construction, alteration, reconstruction, in the same or any altered position of any bank, and the raising, strengthening, improvement, and maintenance of any banks, walls, fences, wharves, docks, or defences for the protection of lands within the limits of this Act from floods or inundations caused by the overflow of the River Thames;" now having looked at that Interpretation Clause, have you any difficulty in expressing any opinions with respect to the question put to you by my learned friend, that this Bill would authorise you to make an embankment all along this district; all along the River Thames?—I hesitate to express that opinion. I am not competent to express such an opinion.

416. You are rather disposed to think so?—I am not a lawyer, and I do not know what the bearing of these different clauses may be one upon another, and I would rather give no opinion upon it.

417. I believe you have made some estimate of the probable cost of keeping out the inundations, under this Bill?—No; I stated that I had not.

418. I want to ask you this; did you not make a communication to the Board of Works on the 20th of March 1876?—Yes.

419. Does not that contain some reference to the probable cost of the works to be executed?—It is very conjectural.

420. It does contain a reference to it, does it not?—I do not know what report you allude to.

421. Signed by yourself, dated 20th March 1876, as to the works necessary to protect the metropolis from inundations from the overflow of the Thames: "The resolutions of the Board of the 10th instant, directing me to report as to the probable cost of the works necessary to prevent the overflow of the Thames within the area of the metropolis, involves considerations so wide that it will be necessary to define more clearly what is intended before such estimate can be formed. If, on the one hand, it were proposed to form a granite-faced embankment, similar to that which has been recently constructed at Chelsea, throughout the whole metropolis, this work would alone cost five or six millions; but the alteration of the various private properties which would have to be made to accommodate them to the line and level of the new embankment would be so varied, and in some cases of so serious a character, that it is not possible to form any estimate of them, nor of the amount of compensation which would have to be paid for interference with wharves and business premises. If, on the other hand, it were proposed to raise the earthen banks in the suburbs by simply enlarging those banks, and to raise wharf and other properties by the formation of a parapet wall upon the existing structures, this might be made effective, although it would have a patchwork appearance, at probably one-tenth cost of the first proposal; but even under this arrangement very extensive alterations would have to be made to wharf and private property, and the claims for injuriously affecting them would be very heavy, and it would be scarcely possible to form any estimate of these items beforehand"—That is just what I stated to you.

422. I understand you to say, in the Report you presented last year to the Metropolitan Board of Works, that all the work necessary to keep out the inundations could be effected for a few thousand pounds?—This year.

423. That is just what I wanted to bring you to; were those temporary provisions merely?—No, I do not think you draw the distinction which I do, which I conceive to be very material. I conceive that if the owners of the property will themselves raise their wharves, as many of them have done, it will be done for a very few thousand pounds. I conceive, on the other hand, that if a public body is to go in and raise those walls, works of a totally different character will be required of that public body; and not only works of a much more costly character, but heavy claims for compensation will be raised, which will exceed even the cost of the works; therefore I draw a very wide distinction between a public body having to do the work, and private parties having to do them themselves.

424. So

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424. So that when you made your report, which was read yesterday, and which was presented to the Metropolitan Board of Works on 6th January 1877, you contemplated the doing of the works by the private proprietors along the river?—That is exactly what I have said.

425. Am I right or not in saying so?—I suggested that the great destruction of property which had taken place should be pointed out to the proprietors, and that it should be shown to them the advantage that might be gained at very little cost to them; and I suggested that if they would take it up, as I thought they would, and do the works, it might be done at very little cost.

426. Did you not write that report in January 1877, under the impression that the proprietors were bound to prevent the inundations coming upon their land?—No, the report speaks for itself.

427. I want your impression?—If you ask me now what my impression was then, I must look at the report.

428. Do you attend the Board?—Yes. You have asked me what my impression was. What I said was, “I have inspected many of the localities which have been flooded, and in my judgment it would be possible, by the expenditure of small sums of money by the owners or occupiers of the river-side property, not in the aggregate exceeding the cost of an Act of Parliament, and in far less time than would be occupied in obtaining such an Act, so to raise the wharf walls, drawdocks, and stairs, so to protect the main bulk of the house and wharf property from future injury. The localities which have suffered most are in Lambeth.” It is clear from that, that what was in my mind at that time was that the parties themselves upon the river should do the work, and not a public body.

429. What I ask is this: were you not under the impression at that time that they were compellable to do the work; I see lower down you say, “At Fulham, Battersea, and Wandsworth, and above the metropolitan area, earthen river-banks might be made and maintained by the owners, under the direction of a controlling authority, as are now the banks of the Thames, which, from time immemorial, have under various ancient commissions been maintained for the protection of the low levels.”

430. Were you not at that time, rightly or wrongly, under the impression that the proprietors could be made to raise their banks?—I formed no opinion upon that subject.

431. Can you give no further answer than that?—That is my answer.

432. You say you were present at the Metropolitan Board of Works on 6th January 1877?—Yes.

433. Did you hear Mr. Roche propound the theory that every riparian proprietor was compelled to prevent the inundations?—I cannot tell whether I was present at that or not.

434. Did you hear Mr. Roche say this: “The responsibility rested not with this Board, but with the vestries and district boards, and with the holders of property immediately abutting upon the river; and until some improved legislation was laid down by Parliament it was for those parties to take steps to prevent these inundations taking place;” have you ever heard Mr. Roche say that?—I hear a great variety of opinions expressed by different members at the Metropolitan Board of Works, but I do not remember what those opinions were.

435. Do not you know that it was propounded at the Board that when this Bill was promoted, it was promoted under the notion that the riparian proprietors were compellable by law to prevent inundations?—I say I express no opinion upon the subject. There is no use asking me questions upon the subject. I can express no opinion upon it.

436. You say you were at the Board; was not Mr. Roche the Chairman of the Committee?—Not of the Board.

437. No, not of the Board, but Chairman of the Committee?—He is Chairman of the Parliamentary Committee of the Board.

438. He was Chairman when this Bill was under the consideration of the Committee?—I do not remember.

439. Do not you know that?—No.

440. But the Bill really comes out of a Committee presided over by Mr. Roche?—He was Chairman of that Committee; but you asked me

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whether he was Chairman on the occasion when it was discussed. I do not remember it.

441. He was Chairman of the Committee which considered this Bill:—Yes.

442. Do not you know that Mr. Roche, the Chairman, was under the impression that the private proprietors were compellable by common law to keep out the inundations?—I do not know what Mr. Roche's opinions were.

443. You do not know that that mistake is the very basis of the Bill now before this honourable Committee?—I do not.

444. Do you know that this Bill was referred to the Works and General Purposes Committee of the Metropolitan Board of Works?—I have no doubt it was.

445. Do not you know that it was?—No; I have no recollection of it.

446. And do you know that that Works Committee reported that “the Thames River (Prevention of Floods) Bill be referred to the Parliamentary Committee to revise the same, so as to make the cost incurred in the erection of any necessary works, which, according to the Bill as now drawn, is made a charge on the adjacent districts and parishes, a charge upon the whole metropolitan area”?—There is really no use in asking me questions on this. I was not present at all the committees, and I do not remember.

447. You tell me that you do not know that the Works and General Purposes Committees passed that resolution?—I do not remember it.

448. Have you never heard of it before?—I do not know whether I have or not.

449. Although we are in Parliament, witnesses must give us the benefit of any information that they have?—I shall be glad to give you any information that I can, but I have no information upon this subject.

450. I ask whether, connected with the Board as you are, watching the interests of the Board in connection with this Bill you do not know that that committee of the Board reported against charging the districts with what was the cost of the works under this Bill?—I have answered you a great many times; I will answer you again. I am engineer of the Board, and if you ask me upon any engineering points I am prepared to give you information; if you ask me what committees did, I have no recollection about them. I was not present at many of them.

451. I was testing your knowledge: if you do not wish to answer me, well and good; because you have not told me whether you know or not; however, if that is the mode of giving evidence here, I must accept it. I refer again to your report, dated the 20th of March 1876. First, there was this suggestion, that an expenditure of five or six millions, with an unascertained amount to be paid in compensation; then there is a suggestion of the patchwork appearance, which would cost one-tenth of the sum; and then there is a third suggestion: “Since the Board have completed the survey and levels along the foreshore of the river, we know that about 30 of the owners of property have raised, or are now raising their banks, as shown on accompanying list; probably more have done so, or would do so without hesitation, if required by some recognised authority. The work done under this arrangement would be generally of the character of that described under Heading 2” (that is the patchwork work), “but the owners or occupiers would in that event find means to carry on their business without such extensive alterations of their property as they would expect if the work were done out of public expenditure, and the claims for compensation would not arise. They would, moreover, be enabled to do the work in such manner, and under such arrangements as would be most convenient to themselves, which a public body executing works under contract could not do. There would still remain some public roads, draw-docks, creeks, and rivers, where public works would have to be executed, but these, so far as we can at present judge, ought not in such event to exceed 100,000*l.*” Is that your opinion still?—Yes; my opinion now is that that is a larger amount considerably than would be required probably.

452. So that you were rather mistaken in saying that you had not considered the possible outlay, because we have it now that you have suggested three schemes, one an expenditure of many millions, another one-tenth of the sum, whatever the principal sum may be of the patchwork done by the proprietors?—I did not state that; I have not considered it; what I stated was that I had not the means of forming an estimate.

453. But

453. But we have it that you have formed some estimate. Now with regard to Fulham, what is the river frontage of Fulham; the length of frontage?—I cannot tell you what it is off-hand.

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454. About four and a half miles?—I will take it from you as right; I dare say you are right.

455. Do you know the distance of the remotest part of Fulham from the river; I mean the Fulham district, which includes Fulham and Hammersmith?—Nearly three miles.

456. And it is bordered in the westernmost part by a county out of the metropolitan area; it is the last district, is it not?—It is the end of the metropolitan area.

457. Then the county comes in?—Yes.

458. The proposed works under this Bill go as far as the metropolitan area extends?—Yes.

459. So that the works would end at the furthestmost part of the Fulham district?—Yes.

460. And Chiswick is next?—Chiswick is the next to the metropolitan area on the west.

461. But is opposite, on the other side of the river?—The Wandsworth parish is the opposite side.

462. But higher up than that, have you, or have you not, a portion of the river included in this Bill?—Yes.

463. What is the extent of that portion along the river; is it a mile?—The metropolitan area extends on the north side of Westminster nearly two miles further than it does on the south.

464. Would not the construction of the works for the prevention of inundation on the northern side of the river have a tendency to throw the river the other side?—No; I have said not.

465. You do not think it would have that effect?—I am sure it would not.

466. Would it have the effect of creating an inundation at the end of the works on the northern side; up to a certain portion there would be a raised bank, or wall, or an embankment; then would not the tide come inside of that and overflow that district?—No.

467. You think not?—No.

468. With regard to the level of Chiswick, is it below that of Hammersmith?—That is a difficult question to answer in that way, because the levels of both parishes vary at different points.

469. Near the point of junction I am speaking of?—At the point of junction they are the same along the banks of the river. I suppose you are aware that in Fulham a very large proportion of the works which are contemplated in that report of mine, have been carried out by private parties.

470. They have carried them out?—Yes.

471. You sent some of those letters you refer to to the Fulham proprietors, did you not?—Yes. There is a very considerable length of bank here (*referring to a section*); there is a quarter of a mile in one length there, and there are a great number of additional pieces; and there is one-eighth of a mile here again.

472. I believe a good many of the people who live at Fulham are market gardeners?—Yes.

473. You know the district?—Yes.

474. Their gardens lie along the river side?—Yes.

475. Do you know that in January of this year they presented a memorial to the Metropolitan Board of Works?—I think I have some recollection of that.

476. Did not they say there that they had, as you now tell the Committee, raised the bank of the river, by a private subscription amongst themselves, to the extent of 18 inches, at their own cost, and that they were anxious to do all in their power to avert the losses arising from the overflow, and yet that the necessary works would be of great magnitude and importance, and they were not able to construct them; that their work had proved of no avail, because the river had inundated their land notwithstanding that?—Will you please read the memorial.

477. I am reading from the memorial: "And the recent overflow at Sand's End was not in any way caused from any want of care in properly sustaining or



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keeping up the banks, but the recent floods occasioned some fearful breaches in the banks, and unless prompt measures were taken the greater portion of Walham Green would be completely flooded;” so that the bank to which you refer has not been successful in keeping out the tide?—The bank to which I refer has been constructed since that.

478. Since when?—I saw it in the course of last month.

479. When was it constructed?—It was very recently constructed, and some of the banks were then in course of being constructed.

480. How recently?—Some are now in course of formation.

481. This memorial was only presented to the Board on the 30th January 1877?—It had reference to a previous bank, which they are now in course of strengthening, just at the place where your memorial comes from; the bank is not quite high enough, within about a foot; the adjoining land has been raised to full height, but that requires to be raised a foot higher.

482. That is a public path?—Yes.

483. And that is done where the public path is, by the Fulham District Board?—I do not know who it is done by; some portion of that is being done by the gas company.

484. Where the public path is, it has been done by the Fulham District Board?—There has been a very considerable rising there.

485. Have you made any estimate of the cost of the works which will be necessary to keep Fulham from inundation?—No.

486. Are you quite sure of that; I have been able to refresh your memory about some estimates?—No, on the contrary, you have been able to refresh my memory, and to show that I was correct in my statement that no estimate had been made.

487. Have you made any estimate about Fulham?—No.

488. Have not you said something about 300,000 *l.* for a certain wall, at all events?—Probably I have; that is to say, I may have stated that to form an embankment such as the Chelsea Embankment all along those parish roads, would cost 300,000 *l.*; I do not know whether I have said so or not.

489. I merely want to get at it?—I think such an embankment would be quite out of place there; it would no doubt convert marsh land into building ground, and in that respect it would be a great advantage to private owners to have their marsh lands turned into building land at the expense of the public; but I think that would be very absurd when they have such earthen banks as they are now raising at a very small cost; and a foot or two put upon the top of the present banks will do all that is needed as regards the prevention of floods.

490. Have you been engaged on the part of the Metropolitan Board of Works in the construction of some bridges over canals in the Paddington district?—No, I have not; all bridges that are constructed over any canals, or roads, or works, have to be submitted to the Metropolitan Board, and I have to examine them and see that they are strong enough, and safe as regards the public; further than that, I have nothing to do with them.

491. Had you anything to do with the Park-lane improvement?—Yes.

492. You know Park-lane was improved at the cost of the Metropolitan Board of Works?—Yes.

493. And Fulham had to pay for it?—Yes, because it was a metropolitan improvement.

494. And Holborn has been improved by the removal of Middle-row?—All over London there have been improvements.

495. There is the Park-lane improvement, the Middle-row improvement in Holborn, and those were treated as metropolitan improvements?—And a great number of others.

496. And the embankments were all metropolitan improvements, and paid for by the metropolitan area, including Fulham?—Yes.

497. Who decides whether an improvement is a metropolitan improvement or not?—The representatives of the metropolis generally.

498. And there is no appeal from that decision?—They are persons representing all the districts; I do not know to whom they can appeal; there is no appeal.

499. There is no appeal?—There is no appeal, and I do not know to what other tribunal you could appeal, who are so competent to form an opinion.

500. I am

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500. I am not testing your opinion as a politician, I only ask the fact; do you know the principle adopted by the Metropolitan Board of Works in deciding whether an improvement is of a metropolitan character or not?—They exercise their own judgment.

501. They exercised their discretion as to this particular case?—Yes.

502. Surely there is some principle that they go upon?—There is that principle; those improvements they conceive to be of a metropolitan character they determine to be metropolitan, and those they believe to be of a local character they determine to be local.

503. You told my learned friend that any highway improvement was of a metropolitan character; is that your view?—I say that an important main thoroughfare is generally regarded as a metropolitan improvement.

504. What do you consider the River Thames to be; is not it a great London thoroughfare, the greatest thoroughfare of all?—Yes, the Thames is a great thoroughfare, no doubt.

505. And do not you think that any permanent improvement of the flow of the River Thames, and of the character of the Thames along its banks, is of a metropolitan and almost of a national character?—No doubt any great work affecting the Thames is such.

506. And assuming that the works that are eventually to be constructed under this Bill will improve the Thames, do you think they would be works of a metropolitan character?—If they would improve the Thames they would be; but you do not suggest that raising the walls a foot, or a couple of feet, is an improvement to the River Thames.

507. I can only put to you what my learned friend Mr. Bidder put to you, Is there in the Bill any limitation of your powers? I have read the definition in the Bill of the words “banks” and “works:” “bank” generally, as defined there, would include any embankment, even if it cost the endless sum you mentioned in the report?—I give the same answer that I gave to Mr. Bidder. I am not here to interpret Acts.

508. Were you present in 1860, when evidence was taken before the Committee of which Sir Joseph Paxton was the Chairman?—I do not remember.

509. That was in 1860?—I daresay I was present at some of the meetings, but I do not remember; that is 17 years ago.

510. Do you know whether or not Sir John Thwaites laid down then some principles which ought to guide the Board in assessing the metropolis, or assessing districts, for the construction of improvements?—I do not know.

511. Now as to the Act of 1855, Sections 69 and 70; you have been connected with the Metropolitan Board of Works from its commencement?—Yes.

512. You recite there that under the Act of 1855, you have now the power to compel districts and riparian proprietors to make erections to prevent inundations; the vestries and districts have power to compel the erection of such works as are necessary to prevent inundation. You have been connected with London, and you have been connected with the Metropolitan Board of Works. Can you tell me whether you have known, in the whole course of your experience, a single proceeding taken against any persons under that Act to compel them to raise the embankment opposite their property by the River Thames?—

Mr. Cripps.] If my learned friend had been here he would have heard me say expressly that no such proceedings had been taken under those Acts.

513. Mr. Williams.] Is that your experience?—I do not know anything about it. I am not here to tell you anything about the carrying out of the Act; I know nothing about it.

514. I have not asked a single question about the interpretation of the Act; I ask you with regard to your own knowledge of facts?—I have nothing to do with any proceedings under the Act; they do not come under my cognizance.

515. I am testing your knowledge of facts, as I have a right to do; and not asking your opinion at all. Have the Metropolitan Board of Works been engaged in making certain improvements in Queen Victoria-street?—They have constructed Queen Victoria-street; it is a new street.

516. And in Kensington also?—Yes.

517. And Wapping?—Yes.

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518. All

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518. All those things have been paid for out of the common fund of the Metropolitan Board of Works?—That is a very general question.

519. I do not say they were executed by the Metropolitan Board of Works?—So far as my recollection goes, I think they were.

520. Do you consider it right that a poor district like Fulham, with its market gardens, and so on, should contribute to the improvements of Wapping, Kensington, and the City, and be obliged to help to pay for all these works along the river, for the general improvement of Lambeth and other parts of London?—I do not ask them to undertake works on the banks of the river for the general improvement of London; that is for their own benefit.

521. Not their own benefit only, but the benefit of the metropolis at large. Lambeth will be benefited; do you contemplate the improvement of Lambeth?—Lambeth will not be benefited, because Fulham is not flooded.

522. Do you know the rateable value of Fulham?—No.

523. Do you know that it is 370,000 *l.*?—No.

524. Do you know any improvement in the district of Fulham that you have done as the Metropolitan Board of Works?—I do not remember any in the immediate neighbourhood of Fulham.

525. I give you a wide margin; the whole district of Fulham. Can you point out a single thing done in Fulham for the benefit of Fulham by the Metropolitan Board of Works?—None of the works done by the Metropolitan Board of Works are done for a particular district.

526. I ask with regard to Fulham district?—The Metropolitan Board of Works have not done any works for the benefit of Fulham *per se*.

527. When was the highest tide of all?—November 1875.

Cross-examined by Mr. Armstrong.

528. Looking at the map, I see there the Quaggy river, and the Ravensbourne river; and there are others not marked?—The Effra river is not a river; it was a brook at one time; it is now a sewer.

529. The Wandle is a river?—Yes.

530. But the Ravensbourne is a sewer, is it not?—No; there is a Ravensbourne river.

531. And the Quaggy, is that a river?—It is a stream, too.

532. The Wandle river is still an open river?—Yes.

533. Is the Ravensbourne river an open river?—Yes.

534. The Quaggy, is it open or close?—Open, a portion of it.

535. Not closed?—No.

536. A considerable portion is closed?—Yes.

537. Is the Effra closed?—Yes, it has become a covered sewer like the Fleet river; that has become the Fleet Ditch, and the Effra and many of the other rivers have become sewers.

538. Before the Act of 1855 they were open, were they not; you have covered them up since, have you not?—Yes, they are all enumerated as main sewers under the schedule of the Act of Parliament.

539. They are now, under the general drainage system of London, closed up, whereas before 1855 they were open sewers?—They were partially open and partially closed.

540. The Wandle is still liable to floods?—Yes.

541. And the Ravensbourne is still partially closed?—No, it is open.

542. Then that causes floods?—Yes.

543. You have a report of the 20th of March 1876, that has been referred to before by my learned friend, Mr. Williams. I see "There would still remain some public roads, draw-docks, creeks, and rivers, where public works have to be executed, but these, so far as we can at present judge, ought not in such event to exceed 100,000 *l.*;" have you made any estimate as to those works?—No.

544. But you would still contemplate, under this Bill, directing that such works should be made?—Yes.

545. And you have formed no estimate as to their extent?—No, I have stated a round sum, that I guessed at, but that is an excessive sum now.

546. May I ask what you found that sum on; have you any figures or facts on which you found it?—No, it is merely a matter of conjecture.

547. I understand

547. I understand from this report that the works you now propose to do will not stop the flooding of the metropolis?—If the works are carried out they will.

548. They will entirely stop the flooding of the metropolis?—So far as the river bank is concerned.

549. But the low parts of London will, notwithstanding these works you want to have the power to order people to do, be still liable to floods?—No, with the exception of the valleys of the Ravensbourne and the Wandle, which are liable to floods, mainly from upland water in heavy rains, and which require a totally different kind of treatment.

550. “Under any of the foregoing conditions the difficulty would arise, that portions of the foreshore, separating the two detached parts of North Woolwich, and separating the North Woolwich from Bow Creek, are not within the metropolitan area; the embankment of this length of foreshore would have to be raised as well as the banks above the metropolitan area, to prevent the flood waters from overflowing them into the metropolis;” so that you would there have a source of flooding?—No doubt.

551. I need not trouble you with the next paragraph; then comes this: “After the general principle upon which the river is to be embanked, or the present banks raised, has been determined, it would necessarily occupy some considerable time to determine the character, form designs, and estimate the cost of the works involved which would be exceedingly varied; many of these could only be ascertained in conference with the owners and occupiers of the premises, and after obtaining a clear understanding of the mode of carrying on their business and of the wants arising therefrom;” this is the Bill which is being promoted; is the object of this Bill to give power to the Board to direct extensive works of that sort to be made?—Yes.

Cross-examined by Mr. Clark.

552. I understand you to decline to be answerable for the drafting of this Bill, or the legal effect of its conditions?—Yes.

553. I understand an estimate to have been quoted of yours; 100,000 *l.* as being possibly sufficient to do this work?—Yes, under certain conditions.

554. Is that doing the work which, in your judgment, would be simply necessary for keeping out the floods?—No; I am labouring under this disadvantage, that you are all referring to a report written some time ago, which I have not before me, but as far as my recollection goes, that 100,000 *l.* estimate refers to work done on private property by a public body, which I described as being works of an unnecessarily costly character if so done.

555. Then have you made an estimate of what the cost of carrying out the works under this Bill would be; the necessary works simply?—I have not.

556. On legal points you decline to express any opinion as to the effect of this Act?—I am not a lawyer.

557. And on matters of expense I understand you to decline to express any opinion?—I have formed no estimate as to the cost of the works.

558. Has it suggested itself to you to consider with respect to the language of the 22nd section of this Bill, which says that in case the Board shall “have executed any larger or more costly works in lieu of, or together with, and in addition to such works, it shall be lawful for the Board” to divide the whole or any part of the expense. There is this provision in Clause 22 to this effect, “Where in any parish or district within the limits of this Act any person by prescription, or by reason of tenure or otherwise liable by law to execute any works has not executed the same, and the Board, such vestry or district board, have executed the same, the Board, such vestry or district board, may by order require payment of and recover the expenses incurred by them in respect of such works from such person, or when the Board, such vestry or district board have executed any larger or more costly works in lieu of or together with, and in addition to such works, it shall be lawful for the Board, or such vestry or district board having executed the same by order, to divide the whole or any part of the expenses.” Has your attention been called to those words?—Yes, I see those words.

559. Has your attention been called to them before, to consider the effect of them?—I have not considered the effect of the Bill; it is not my province.

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560. I should like to get, if possible, from you some suggestion as to what kind of works would be required in addition to those which the persons would be liable to do for the purpose of protecting them from floods?—As I said before, I cannot describe the kind of works; I cannot do so at the present time.

561. Assuming that the works required for the protection of the district, or of the river bank, could be done at a small cost, can you suggest what works would be done or could be done under this Act, in addition to those necessary works?—A great variety of works; some would be more costly than others.

562. Of course a great variety of things might be done, but what works does this Act contemplate in addition to the necessary works?—It cannot be in addition to the necessary works; if the necessary works are done no other works are necessary.

563. Then your view is that this Bill only deals with the necessary works; is that so?—I suppose this Bill contemplates the necessary works.

564. Do you attribute any meaning whatever to the words “in addition to”?—I must decline to put an interpretation upon the meaning of the words of this Act.

565. I accept that refusal at once, but it might be useful if you could suggest what sort of more costly works would have to be executed; have you considered the position of the inhabitants of the St. Saviour's district and the proportion of river frontage that would fall to their unfortunate lot under this Bill; it is a very narrow district back from the Thames, is it not?—It is.

566. Have you considered that; do you know the measurement of it?—No, but I can tell the measurement by referring to the map.

567. Is not the line of river frontage very large indeed in proportion to the extent of the St. Saviour's district?—I think it has a long frontage for a small district.

568. Behind that district does the land continue at the low level?—I have not the parish boundary marked upon the map. I have not looked at it with reference to parishes.

569. We may take it that there is a very long water frontage in comparison with the area of the St. Saviour's district?—I take it from you that it is so, if you state so.

570. I do not want to reverse our positions?—Then I cannot give an opinion on it.

571. That is a point which you have not considered in reference to this?—No.

572. That is one of the financial aspects with which you have not dealt?—No.

573. Do I understand you that your evidence is directed to telling us that the river can be embanked?—It has been directed to telling you what I have been telling you for the last two days.

574. I have read it very carefully?—Generally with reference to the works.

575. The river can be embanked, and it will be a very useful thing?—And a very necessary thing.

Cross-examined by Mr. Greene.

576. Have you paid any attention to Messrs. Cory's wharf or to Messrs. Davey & Thompson's wharf?—Yes.

577. The Metropolitan Board of Works sent out notices by which they suggested that Messrs. Cory should raise the embankment three feet or four feet?—Yes.

578. Was that after any measurement by you personally?—Not by me personally; by levels taken by my assistant.

579. Where were the levels taken; in what way did you get at them?—By the ordinary way of taking levels.

580. Have you any notes before you, or do you know whether the loopholes or entrances into Messrs. Cory's wharf are of different heights?—There are four loopholes to Messrs. Cory's coal wharf which vary from one foot above Trinity high-water mark to three feet above Trinity high-water mark.

581. In your judgment, would a uniform raising of three feet suffice to protect them from inundation?—It would not be necessary to have that; it would more than suffice in some cases.

582. Your

582. Your notice said three feet?—To the extreme height of three feet.  
 583. The notice which the Metropolitan Board of Works sent required them to raise it three feet?—That is the main opening.

584. Had you any data before you to show the height, supposing it was raised three feet; what height or aperture would be left for the coal to be carried through?—Fifteen feet headway.

585. That is allowing three feet?—Yes.

586. Are there offices immediately above the apertures?—There are, I think.

587. Is Messrs. Cory's wharf one of the wharves as to which this observation was made by you: "There is, however, a class of property more difficult to deal with, namely, those wharves where the main floors and sills of the doors or loopholes are below the level of extraordinary high tides"?—Yes.

588. Is it to Messrs. Cory that your other observations apply: "The alterations of doors and loopholes could hardly be met by a public body without the rebuilding of the premises"?—Yes.

589. Then, in your judgment, it would be necessary, if a public body were to do this, to rebuild Messrs. Cory's wharf?—I should not propose to do anything of that kind. What appears to me to be requisite in this case would be to adopt one of the plans of having slides which could be removed during the course of the business, and fixed in those loopholes when the business hours were over.

590. Does that apply to the lowest level, which you say was one foot and a half above Trinity level; one of their apertures is a foot, or a foot and a half, above Trinity level?—I am not going to pledge myself that that is the best way of doing it.

591. You do not suggest, as a practical man, that those sorts of doors could be put in at the barge-building slip?—If you let me answer you, I will tell you what I suggest. I am not going to pledge myself as to what would be the best way of altering this at the present time. I think it very probable that doors could be put in in that way. If they could not I should be prepared to suggest some other mode of keeping out the tide, which at the same time would enable the business to be carried on without that alteration.

592. As to the proper and best mode of effecting the purpose you wish of keeping out the inundation, there may be various schemes applicable to Messrs. Cory's particular wharf?—No doubt; and so long as the object of keeping out the tide is accomplished in the most convenient way to their business; that is the mode which I should recommend.

593. But without any regard to uniformity of system along the river?—Yes; uniformity of system along the river must mean the destruction of a great deal of the business of the river, and that can only be met in detail in the way I now suggest.

594. As to the point of Messrs. Cory's wharf, you adhere to your opinion that it may be necessary for alterations in the doors and loopholes, that there should be a rebuilding?—In those cases, if a public body required to alter the works in such a way as should be most approved by the parties themselves, it would probably involve a rebuilding of the premises.

595. Then the parties themselves, if they are considering the interests of their business, would have to rebuild part of their premises?—No; that is not my meaning. I mean if the parties themselves had to alter their business in the way most convenient to themselves, they would find no difficulty in doing it; but if a public body had to do it in the manner they considered convenient, in all probability their requirements will be such that it would involve a very heavy expenditure, and in some cases the rebuilding of the premises. I mean to say that the difficulties that would be raised, and the demand for compensation, and the difficulties thrown in the way, and the objections raised, would be a totally different thing; that is my experience.

596. With respect to Clause 22 in your Bill, are there any persons on the river referred to under the expression, "Any person by prescription, or by reason of tenure, or otherwise liable by law to execute any works;" who had you in mind?—I did not draw the Bill.

597. Do you know anyone to whom it relates?—I express no opinion upon that at all.

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598. You told my learned friend Mr. Philbrick that two-fifths of the wharfingers had complied with your notice?—Yes.

599. Is there not a great diversity of wharf along the river?—A great diversity.

600. And those persons who have complied with your notice are persons who had quays, and not loopholed walls like Messrs. Cory?—A great many of them have loopholes, and many of them who have loopholes have raised them by filling in brickwork, and some have treated the loopholes in the manner I describe.

601. Will you give the names of some one who has done it; not by the loopholes such as you describe?—There are a great number of them, but I am afraid I cannot distinguish the class of work from the map before me.

602. It becomes rather important as to the particular class of work I am now dealing with?—Although I should have a difficulty in identifying the exact places here, from the map before me, or from memory, I can state as a fact that a very considerable number have done it in that manner. I have recently been down the river and seen work of that character to a large extent constructed. I can give you one case now; there is one between South Devon Wharf and the entrance to St. Katharine's Docks; that has been done partly by brickwork and partly by the loopholes, and there are a great many others of the same class; there is another, Watson's Wharf, near Wapping entrance; you may take it as a fact that there are a great many illustrations of it.

603. I want a particular case, so as to test the effect of it practically. Speaking as an engineer, can you tell the Committee, assuming the work to be done to Messrs. Cory's wharf that you were speaking of, what area would be benefited by it?—I cannot tell the exact extent of the area.

604. Can you put forward any engineering test of the area which may be benefited by an embankment of that kind?—All such areas as are liable to floods will be benefited.

605. Do you mean all such areas as in the past have been flooded?—All such areas as are below the level of the high tide, and which are subject to flood.

606. How many feet back inland will be benefited by an embankment in front of Messrs. Cory's wharf, such as you suggest?—I cannot give it in feet.

607. Is there any practical way of ascertaining it?—Yes.

608. When you say the area may be benefited, do you refer to the distance inland to which the flood previously had extended?—I say all lands under the level of the high tide would derive benefit from excluding the tides.

609. As far inland as is below the level of the tide will be benefited?—No doubt.

610. That is as to length inwards; what length longitudinally will be affected or improved?—That answer refers to lengthways, breadthways, and every way.

611. Taking Mr. Cory's wharf; supposing that work to be done, how many acres will be benefited by it?—It is impossible to put it in that way. When I speak of benefit, I am speaking of the whole work. When this is all done and the tide excluded, then all that district below the level of the tide would be benefited.

612. Are we to understand that unless there is a continuity of embankment all along, it will be no use for separate proprietors to embank for themselves?—It will not exclude the tide; it will reduce the evil; each one who does it will reduce the evil to some extent.

613. I want to know how the vestry, under Clause 16, are to apportion in their particular parishes, the rate which you are to impose upon them?—That I cannot answer.

614. Is there any engineering test or any other scheme that you can suggest that the vestries may adopt. It says in Clause 16, "Any such vestry or district board for the purpose of paying any expenses from time to time incurred by them under this Act, and not hereby otherwise provided for, may raise the sums they may require by borrowing, or by means of rates in every respect, as if such expenses were expenses of such vestry or district board incurred in the execution by them of the principal Act with respect to permanent works; and any such vestry or district board in any case in which it shall appear to them that such expenses have been incurred for the equal benefit of the whole of their parish or district."



district, may by order direct the sum or sums necessary for defraying such expenses or any part thereof to be levied in such part;" is there any way which you can suggest by which the vestry may determine what part of their parish is benefited by it?—I suggested one way; there may be others.

615. I failed to gather the one you have suggested?—The test of levels.

616. According to this system, the benefit done by the embankment in one district may benefit another district?—It may.

617. Then there may be a conflict between the vestries as to how it should be apportioned?—And it would be adjusted if there was.

618. Will it occur?—I do not know that it will.

619. You told my learned friend, Mr Philbrick, that according to your view the frontagers or outside occupiers ought to do the work of embankments at their own expense?—I said I thought it would not be unreasonable.

620. Is it your scheme or your view that they should pay for this work, although injury may be inflicted upon their business?—I have expressed my opinion upon that.

621. I want to get your opinion clear, because then we can understand it and appreciate it?—It has been done by many already, and it would not be unreasonable that the others should do it also.

Cross-examined by Mr. Michael.

622. May I ask you a question or two as to the district board of Wandsworth; what is the extent of the district so far as the river frontage is concerned?—I must give the same answer that I have done before; I have not the divisions of the parishes, and cannot answer it without some data before me.

623. There is one point that you know; in one portion of the district does the River Wandle run down?—Yes.

624. Do you call that a tidal river?—A creek; a portion of it is tidal.

625. How would it be affected under the Bill?—I can hardly answer that, whether the water would extend up to the creek or not.

626. Does it extend up to it?—I should apprehend it would.

627. Will you point out what in the Bill you rely on for that?—I apprehend a portion will be treated as part of the River Thames.

628. The Wandle?—The Wandle after you get past Wandsworth Bridge is a stream; until you get up to the bridge there is a small portion of creek.

629. How far does the tide go up that creek?—A short distance only.

630. For the distance that it goes, whatever it may be, that is a tidal river?—No doubt.

631. Have you made any plan or made any estimate as to the amount of works which would be required to keep out floods in this part of the district?—No.

632. You have not entered into details as to how it would affect private individuals, and how it would affect the vestries?—Yes, I have, to a considerable extent.

633. Will you tell me what proportion of any works would have to be borne by the private individuals first in that portion of the district nearest Battersea Bridge?—I cannot give it in that way.

634. Can you give it in any way?—If you ask as to any particular part what is required to be done, I can tell you.

635. Divide it into two, Battersea and Wandsworth, what is required to be done in Battersea?—First we have Battersea Park.

636. Battersea Park is already embanked; would anything require to be done as far as Battersea Park is concerned?—No, nothing is required to be done there.

637. That does not begin the district of Wandsworth?—You asked me about Battersea.

638. That is Battersea Park; it does not exhaust the whole of Battersea?—No, I was commencing there.

639. Had not you better begin at Wandsworth and go on; take it in your own way, but do not begin in the middle of the district; I thought you would begin at Nine Elms and go on?—There is the London and South Western Railway Wharf, which has been raised by them.

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640. How much?—Two feet.

641. Does anything further require to be done?—No.

642. For how great a distance is it?—A quarter of a mile.

643. The whole distance is about five miles?—Yes; then there is Palace Wharf, Wallace's Chemical Works; they have raised their wharf.

644. Does anything require to be done there?—No, they raised it to a sufficient height. Then there is the Bourne Valley Wharf; they have placed a tidal gate at the top of their draw-docks, which will answer the purpose if that tide gate is kept closed in times of high floods. Then there is the Iron Steamboat Company, who have raised their wharf with woodwork.

645. Does anything require to be done there?—No; all those have done their work sufficiently. Then we come to Johnson's Coal Wharf; these are works which have been done within the last few months, since the flood of January.

646. If you go on *seriatim*, it will save a great deal of time; but I must have it done?—There is Johnson's Coal Wharf; that has been raised; and Beaufoy's Wharf has been raised with brickwork. The "Swan" public-house has been raised with brickwork; Johnson's Coal Wharf has been raised 1 foot 9 with timber; the White Swan Wharf has been raised 9 inches with brickwork to a sufficient height; the Portland Cement and Lime Wharf has been raised with brickwork; the Whiting and Lime Works of Messrs. Watney and Company have been raised with brickwork; Messrs. Page and East, barge builders, they have raised their works with brickwork.

647. Pass over those, and come to something where work is required to be done?—There is the Crown Wharf, Messrs. Young Company, Engineers; they have not raised their wharf.

648. What is the frontage there?—It is 100 feet in length, and they ought to raise it about 18 inches; the same thing applies to the Victoria Wharf, John Ward, that is 150 feet in length. Then we have the Portland Wharf, a joinery works, that requires raising about 9 inches or a foot. Then we have the Southwark and Vauxhall Waterworks, and that requires raising from 3 inches to 9 inches.

649. Will you give the length of frontage?—The length I am speaking of now is a very considerable length, more than a quarter of a mile; the railway company's dust yard, for a short length, wants raising a little. That brings us to Chelsea Suspension Bridge. There is a small piece which has been raised next to it on both sides of the Chelsea Suspension Bridge. Then we come to Battersea Park.

650. Does anything require to be done there?—No; that carries us on for some distance.

651. Do I understand you clearly that that is at a sufficient elevation to require no works?—At one end of it, near to William's Barge Works, it is depressed.

652. What are the works under the Bill which you say ought to be done?—I can do this more shortly by putting this before the learned counsel.

653. No, I must have it upon the notes. Will you answer me this question: is this a work for all time, or is it a work that may be modified subsequently, and further works required to be done as the river may be altered in its level, or altered in its circumstances by bridges, or various embankments, or other matters?—It is impossible to say what may take place in the future. There has been, within the last half century, a rising of the tide, and it may be possible, from improvements in the next half century, that there may be a still further rise of tide, but for many years to come this will be sufficient.

654. Circumstances may arise so that all the works that you have detailed to me may be a temporary expedient to meet the defect at the present time?—No, certainly not; circumstances may arise, and at some future period it may be necessary to add to the works to some little extent, to make them complete.

655. The more rapid drainage of the upland grounds, bringing a larger quantity of water more rapidly down, would entail and necessitate additional works to be constructed?—It has some small effect, no doubt, upon the rising of the tide, but very small as compared with the improvements of the river we have been speaking of.

656. I will

656. I will take you shortly up to this one point; the whole of these wharves belonging to private individuals, I suppose, are to be raised in accord with some certain law you have laid down?—Yes.

657. When they are below two feet they must be raised two feet, and where they are below one foot they must be raised one foot, in order to come up to your level?—Yes.

658. Now I will come to this point; with regard to the River Wandle, it empties itself into the Thames?—Yes.

659. What is the condition of the banks of the Wandle?—The banks of the Wandle are low.

660. How far does the tide go up the River Wandle?—I think not very far; I cannot say exactly.

661. Do you know the situation of the osier beds?—Yes.

662. How will they be affected by any of the works you propose?—The tide covers the osier beds.

663. Supposing you embanked right up the Wandle on both sides, you have a large amount of low-lying ground on the Wandle, how do you propose to deal with the banks of the Wandle in order to prevent, when you have embanked on both sides, the tide running up and flooding the country, the tidal water going over the banks of the Wandle?—Either the tide would have to be excluded from the Wandle, or the banks of the Wandle would have to be raised.

664. Is there any provision in the Bill to extend the provisions of the Bill to all rivers in the same condition as the Wandle; to prevent any of the low-lying country being flooded when the tidal waters get access?—That I cannot tell.

665. Would it not be a very serious defect if you have not provided for that contingency?—If the Bill would not enable that flood to be prevented, it would continue to be flooded.

666. Is it not an inevitable consequence, if you have low-lying tidal river emptying into the Thames, and if you embank up to the embouchure of that small tidal river, or any tidal river emptying into the Thames, and have made no provision that all the low-lying lands will be more flooded than before?—It would be possible to exclude the floods by works upon the banks of the river.

667. Have you provided for anything of that kind?—The Bill gives power to do any works necessary.

668. Under what clause?—I take it under the general power of the Bill to do the works.

669. Will you give the slightest sketch as to how it can be done?—The power to raise and continue the bank in such a way as to exclude the tide.

670. Have you made any investigation whatever as to how far up the river the streams emptying into the Thames require to be excluded?—I am not suggesting that; I assume that you are dealing with the banks of the Thames alone; it is possible by works upon the banks of the Thames alone to exclude the tide from the upper part of the river; it might be that it would be the cheapest way.

671. What do you mean by works?—I mean gates.

672. Flood-gates?—Yes.

#### Cross-examined by Mr. Castle.

673. Before the promotion of this Bill, was not it your opinion that by the combined efforts of the wharf owners and the district boards and vestries all the necessary provisions for keeping out the tide might be obtained?—I think still they could do it physically, but the difficulty is to get them to do it.

674. Therefore the question really is whether there is any power in law at present to enforce the duty upon the vestries and the wharfowners of keeping out the tide?—Yes.

675. And I understand from your report, which you read yesterday, that if each wharfowner was to raise his own premises in a manner most convenient to his own business, and if the various public bodies were to raise their portion of the public frontage, the whole thing might be done a cheap and easy way?—Yes

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676. And

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676. And on the other hand, if a central body like the Metropolitan Board of Works comes in and tries to enforce this duty upon them, questions of compensation may arise, and loss of trade might occur, which would swell the tning up from a few thousands to millions?—I stated that that might be so if the Board had to do it themselves; if the Board had power to require them to do it, there is no necessity for heavy claims for compensation; but if the Board have to do it as a public body, then a number of those claims would arise.

677. And if the claims did arise, they would swell the estimate, which might be a few thousands, up to millions?—I do not say millions, but very very large figures.

678. You used the word yourself, "On the other hand, if a new and uniform embankment is to be formed by any public body along the rest of the southern bank of the Thames, similar to the Victoria and Albert Embankments, the expenditure on works, although very large, will be much less than the expenditure for compensation for injury done to the business of the wharves along that shore, and the cost must be counted in millions"?—Yes, that is speaking of any uniform embankment along the whole frontage of the river, and the compensation.

679. You say if that is to be done by a public body, *quâ* public body, various questions will arise, and considerably increase the cost?—It will be more costly than if done by themselves.

680. And you say that, in your opinion, you think the primary duty is upon the wharfowner, to raise his wharf for the purpose of keeping out the tide?—That it the very reason why he should.

681. And I understand you to say the reason for it is, that he enjoys the benefit and privilege of being on a large navigable river, and having water-way to his premises; and it is not much to ask him to keep the water out from his premises?—Yes.

682. Upon that opinion you acted when you sent forward your circular to the different wharfowners along the Embankment, did you not?—Yes, we invited them to do the works.

683. Upon those letters being sent forward, you said a large portion of the wharfowners have carried out the suggestion?—Yes.

684. If the burden of doing the work, which is not executed, is thrown upon the other riparian owners, those persons who have carried out your wishes will have to pay twice over. They will have to contribute towards the works in default, besides doing their own share, if it is thrown upon the general body?—I suppose it would be all a matter of arrangement.

685. If there is any general provision that the works not done by private owners should be done either at the expense of the districts bordering upon the Thames, or at the expense of the general metropolis, then the persons, say the London and South Western, who have already carried out large important alterations in pursuance of your circular, will have to contribute again?—Yes, if they have constructed all their works, they will be called upon to contribute for the others.

686. Would not that be to a certain extent an act of injustice?—Yes.

687. The same reasoning will apply to district boards; the Limehouse district boards have done all their works; they have executed all the requirements necessary to keep out the floods, and if they have to contribute to pay for what the other district boards have not done, they will have to contribute twice over?—No doubt if they have done their works, and have to contribute towards others who have not done their works, it would not be just.

688. You take very large powers under the Bill. We have heard that though you have thought in your report a mere individual alteration of the different premises would be sufficient, you have taken power sufficient to enable you to make the embankment yourself if you like?—I do not know to what extent the powers would go.

689. You do not speak to questions of law, but you are an engineer, and are accustomed to deal with these things; and it may be necessary for you afterwards to consider what powers you have. Clause 5 is: "The Board, in order effectually to protect lands within the limits of this Act from floods or inundations caused by the overflow of the River Thames, shall have power from time to time to make, alter, vary, or amend such general or special orders as to them may seem proper for the purposes following." You do not limit yourself to Clause 69

of

of the Metropolis Local Management Act, which gives the districts power to construct "banks, wharves, docks, or defences abutting on or adjoining any river, stream, canal, pond, or watercourse, in such parish or district to be raised, strengthened, or altered or repaired, where it may be necessary so to do for effectually draining or protecting from floods or inundation such parish or district." You do not limit yourself to those powers?—I must decline to express an opinion as to the extent of our limitation under the clauses of the Act.

690. You have already told us that those powers were sufficient to carry out the purposes of this Act?—I do not think I have.

691. "Causing all banks, wharves, docks, or defences abutting on or adjoining any river, stream, canal, pond, or watercourse in such parish or district to be raised, strengthened or altered, or repaired, where it may be necessary so to do." Is not that the very thing you have been requiring these different owners to do?—I decline to express any opinion upon the Act.

692. I am sure you will not put me off upon a question of law, when it is simply a question of fact; have not you been asking the various owners to do that which is properly covered by these words, "Causing all banks, wharves, docks, or defences abutting on or adjoining any river, stream, canal, pond, or watercourse in such district to be raised, strengthened, or altered or repaired, where it may be necessary so to do"?—We have gone upon that.

693. And have not you said that if properly carried out it would have been sufficient?—Yes.

694. I ask whether these powers contained in this section are not sufficient?—Then I decline to answer that question.

695. The powers you ask in the Bill are different, and beyond that; now I call your attention to the 6th Clause, you see you extend the power: "The powers conferred upon vestries of parishes and boards of works of districts by Sections 69 and 70 of the principal Act, with respect to the works necessary for the draining and protecting from floods and inundations of such parishes and districts, shall extend and apply to and include works as defined by this Act; therefore the Act has in contemplation other works, additional and beyond those works, contained in Clause 69?—I still decline to express any opinion about the Act.

696. I must continue to put the questions; if you will not answer them, I cannot press you; but in this Act of 1869, 18 & 19 Vict. c. 120, the Metropolis Local Management Act is the Act which formed the Metropolitan Board of Works, the Act of 1855?—Yes.

697. And that Sections 69 and 70 define the power of the vestries and parishes?—I must give the same answer as before.

698. Will you take it from me that it did?—Yes, I will take anything from you you please.

699. And Section 135 defines the power of the Metropolitan Board of Works; now will you take it from me that powers were given in Section 135 to the Metropolitan Board of Works to look after the drains and do various other things, but no power was given to interfere in any way with the banks of the river?—I really must continue to give the same answer; you ask me to interpret Acts of Parliament, which I decline to do.

700. I do not ask you to interpret Acts of Parliament, but I ask you whether you do not know that the Metropolitan Board of Works, under their Acts, have no authority to carry out these works?—I express no opinion upon what authority they have or have not.

701. Have you said in your letter ——?—It was a letter addressed by the Board, not by me.

702. It is signed by the clerk of the Board, but you are responsible for it, are you not?—No further than my report suggests.

703. You say, "In making this communication, however, I am to state that it is not the intention of the Board to interfere with the duties and obligations of vestries and district boards who are specially charged with these matters by the Act of Parliament, or in any way to put aside the authority of any such bodies"?—That is so.

704. I may take it from you that in your opinion, as expressed in that report, you do not think it necessary that there should be any central supervision in this matter?—On the contrary, I think it is necessary.

705. In your report, I say?—No, I have not said so in my report.

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706. Excuse me?—Will you refer me to where I say so.

707. It is constructively so: "Within the last two days I have inspected many of the localities which have been flooded, and, in my judgment, it would be possible by the expenditure of small sums of money by the owners or occupiers of the river-side property, not in the aggregate exceeding the cost of an Act of Parliament, and in far less time than would be occupied in obtaining such an Act, so to raise the wharf walls, draw-docks, and stairs, as to protect the main bulk of the house and wharf property from future injury." The last paragraph I have read before: "By the combined effort of a few wharfingers and district boards and vestries, I venture to affirm that it is quite possible at an expenditure of a few thousand pounds, and within the next six years, to prevent the overflow of the Thames within the denser portions of the metropolis by the highest tides that have ever yet been recorded." There is not a word there of central authority, or central power, or the Metropolitan Board of Works executing works, or doing anything of the kind. You put it there a combination of a few wharfingers who are to do the duty of raising their own wharves; is not that so?—I said that it was quite possible for them, if they did it at once, to do the works at small cost, and long before this.

708. You referred in your evidence of yesterday to a copy of the court record of the Commission?—Yes.

709. Have you them here. You have examined these records?—Yes.

710. Was the former rule that the Commissioners of Sewers called upon these various owners to raise their wharves where necessary?—Yes.

711. And if they refused to do so, they fined them 100 l.?—Yes, there was the case which I read yesterday in which that was done.

712. You gave also a case in which the clerk looked into the practice, and reported the custom of the Commissioners to enforce this duty upon the wharf-owners?—Yes.

713. We have already heard from my learned friend, Mr. Cripps, that it was the intention of the Legislature that those powers, such as they were, should be continued to the various district boards and vestries; if those powers had been continued there would have been no necessity for this Bill, would there?—That I do not know.

714. If there had been power to enforce upon all these various parties to whom you gave notice the raising of the various premises in the manner you required, it would have been sufficient, and you think there would have been no necessity for this Bill?—I apprehend not.

715. The question then really becomes whether those powers do survive in the Act of 1855, Section 69, or whether they do not?—I suppose so.

716. And if they survive within the section, then the necessity for this Bill passes away. Now may I ask you to follow me when I read the provisions of Section 69: "The vestry of every parish mentioned in Schedule A. to this Act, and the board of works for every district mentioned in Schedule B. to this Act, shall (subject to the powers by this Act vested in the Metropolitan Board of Works), from time to time repair and maintain the sewers under this Act vested in them, or such of them as shall not be discontinued, closed up, or destroyed, under the powers herein contained, and shall cause to be made, repaired, and maintained such sewers and works, or such diversions or alterations of sewers and works as may be necessary for effectually draining their parish or district, and shall cause all banks, wharves, docks, or defences abutting on or adjoining any river, stream, pond, or watercourse in such parish or district to be raised, strengthened, or altered or repaired, where it may be necessary so to do, for effectually draining, or protecting from floods or inundation such parish or district." There is an absolute power given for doing the very things that you say you require here. Then comes the further provision which refers only to the question of sewers and works, and not to the question of banks, "and it shall be lawful for any such vestry or district board to carry any such sewers or works through, across, or under any turnpike road, or any street or place laid out as or intended for a street, or through or under any cellar or vault which may be under the pavement or carriage-way of any street, and into, through, or under any lands whatsoever, making compensation for any damage done thereby, as hereinafter provided;" if those powers are sufficient to call upon the various wharfowners to erect their works in the same way that the Commissioners had

had power to do ; you agree with me that the present Bill is unnecessary ?—If there were sufficient power. Sir J. Bazalgette.

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717. If those words contained sufficient power ?—If they are sufficient to enable the Board to require all vestries and district boards to make all parties to raise their walls, there would be no necessity to come for further powers.

718. And if from ambiguity of language that power, though intended to be given, has not been given, would it not have been simply sufficient to have amended the section ?—I do not give any opinion upon that.

719. My learned friend says that is what you are doing ; taking power to re-embank the whole of the Thames is rather a different thing from calling upon different owners to raise their wharves ; have you incorporated the Lands Clauses Act ?—I do not express any opinion upon that.

720. You do not say much beyond engineering ?—No, I do not come here to give evidence about law.

#### Re-examined by Mr. Cripps.

721. I am going to ask you as few questions about law as possible ; in the first place, you have been conversant generally with the powers contained in the existing law under Section 69 ; at any rate you know that Section 69 has existed as law for a considerable time ?—Yes.

722. And you know of no case up to the present time in which, notwithstanding the existence of that in the Act of Parliament, it has ever been put into execution requiring parties to raise banks ?—No, I do not.

723. But if it had been capable of being put into execution, the necessity for it, so far as you know, has arisen many times over ?—No doubt.

724. You have told us that that section has never been put into operation to your knowledge, although the cause has, to your knowledge, frequently existed ?—It has.

725-6. I do not know whether you know that as to the legal part of the power of putting those sections into execution, the Board have been thoroughly advised from time to time ?—They have consulted their legal advisers upon those points and not me.

727. My learned friend Mr. Bidder asked you whether you were not compelled to have plans in all matters which you have to do under the Metropolitan Board, and whether this Act by which you produce no plans, was not new legislation and entirely exceptional. Let me call attention to the powers conferred generally upon the Metropolitan Board in the Act of 21 & 22 Vict. c. 104 ; is this the Clause, “The Metropolitan Board shall cause to be commenced as soon as may be after the passing of this Act, and to be carried on and completed with all convenient speed, according to such plan as to them may seem proper, the necessary sewers and works for the improvement of the main drainage of the metropolis ; and for preventing, as far as may be practicable, the sewage of the metropolis from passing into the River Thames within the metropolis ;” was not that a power expressly given to you to do this work and to prevent the sewage passing into the river according to such plans as to you might seem proper ?—Yes, I so stated to Mr. Bidder.

728. And it was acted upon and done ?—Yes.

729. Are you aware that that was an alteration of the former Act ; that the original powers for constructing works of main drainage were contained in the 135th section of the 18th & 19th Victoria, to which my learned friend referred, by which the Board were empowered to make such sewers and works as they might consider necessary for preventing “all or any part of the sewage within the metropolis from flowing or passing into the River Thames in or near the metropolis, and shall cause such sewers and works to be completed on or before the 31st day of December 1869.” The 135th section of that Act required, before any plans should be carried into effect, that they should be approved by the Commissioners of Her Majesty’s Works and Public Buildings, and this Act I now read entirely removes the restrictions, and provides that you are to execute the necessary works according to such plan as to you seems proper ?—Yes ; difficulties arose with respect to that veto, and it was afterwards removed ; the veto of the First Commissioner of Works.

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730. Therefore



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730. Therefore you have had those powers, and have exercised those powers committed to you by the Legislature for effecting the works according to any plan you thought proper?—Yes.

731. Those works would have gone to the extent of four millions of the public money?—Yes.

732. In the present case you ask power in the same way to do such works, only to a very much less extent, as to you may seem proper or necessary to prevent the inundations?—Yes.

733. It is put to you that a parish, with a large frontage to the river, and a small district might be prejudiced by having to do works which would, in fact, benefit some other body than their own; is not that entirely provided for by the Act itself, that the works are to be paid for by the parties whom they benefit, whether they are in the parish or any other parish?—I do not express an opinion as to that.

734. Let me call your attention to Section 7 first of all: "The Board may, by any general or special order under this Act, require the vestry of any parish, or the board of works for any district within the limits of this Act singly, or the vestry of any parish and the board of works for any district, or the vestries of any parishes, or the board of works for any districts, or the vestries of any parishes and the boards of works for any districts, within the limits of this Act, jointly to execute any works which the Board may deem necessary or expedient for effectually protecting such parish," and so forth. Therefore, if there is a large frontage to the river, the other parishes would benefit according to their level, and the Board has full power to order the costs to be paid by those benefited by it?—Yes. I stated that I thought there would be no difficulty in adjusting those matters.

735. It would be perfectly immaterial, would it not, whether that parish had a large frontage or a small frontage to the Thames, unless it followed that the whole benefit was derived by that particular parish?—Yes, if properly adjusted.

736. A parish might have a very large frontage to the Thames, but inasmuch as other parishes might be more benefited than themselves, those parishes would have to contribute a larger sum than the parish immediately adjoining it?—Yes.

737. Then as to the apportionment of expenses afterwards, let me call your attention to Section 23: "Where under the authority of this Act any vestry, district board, or person may be directed or permitted by the Board to join with any other vestry or vestries, district board or district boards, person or persons, in executing any works or in paying any expenses, it shall be lawful for the Board to apportion the work to be done or the expenses to be paid between such vestries, district boards, and persons respectively, in such manner as the Board consider just and reasonable." It would follow, would it not, that where, in the case of Fulham which I put to you, where there is a long frontage to the Thames, or in case of St. Saviour's which I put to you, which has a small frontage to the Thames, it would be perfectly immaterial to the persons who would pay?—Yes, if it was properly adjusted according to the benefit.

738-9. With regard to the power to take land, which is another objection of my learned friend Mr. Bidder's, I do not know whether you are aware that the powers which we have under the former Act are precisely the same under this Act?—So I am told.

740. I am going to show that it is exactly the same here; the control in the former Act was that we could only take lands compulsorily by the authority of the Secretary of State now comes this power here; they may for the purpose of executing any works under the authority of this Act, enter upon, take, and use any lands or streets which he or they may require for the purpose of executing such works or giving effect to the provisions of this Act, and the provisions of the Lands Clauses Consolidation Act, 1845, as incorporated with and extended by the principal Act, shall extend and apply to the entering upon, taking, or using of such lands and streets, subject to the conditions of the principal Act with respect to the taking of lands compulsorily by the Board as amended by this Act." Are you aware that the Lands Clauses Consolidation Act, 1845, as incorporated with and extended by the principal Act, limited our powers to take land compulsorily, except by the authority of the Secretary of State?—Yes, my attention has been drawn to that.

741. And

741. And that is exactly the same limitation—that we embody. We take powers “as incorporated with and extended by the principal Act;” therefore, we are bound by exactly the same powers as we were bound by in the principal Act. Then the clauses go on: “For the purposes of the Lands Clauses Consolidation Act, 1845, and the service of notices required by the principal Act, to be served upon owners or reputed owners of lands, before applying for the consent of the Secretary of State to the taking such lands compulsorily, the term ‘owner’ shall have the same meaning as in the Lands Clauses Consolidation Act 1845.” We were required by our principal Act to give notices to owners of land before applying for the consent of the Secretary of State?—I told Mr. Bidder at the time that, as far as my judgment went in the matter, I believed that this was parallel, and the same case as the Main Drainage Act, the Metropolitan Local Management Act. My attention having been since called to the clauses, I believe I was right in my opinion.

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742. Mr. Cripps.] So far as you know, you have been called upon to act under the clauses of the Main Drainage Act, and there is nothing whatever in the power now sought for which was not sought for and given by that Act?—I was under that impression when Mr. Bidder challenged my view of it; but since then I have looked carefully at it, and I believe I am right.

743. I have one other question to ask you as to that; that same Act to which I referred gave you large powers, did it not, of doing works on the Thames; is this one of the powers which you have under the Act which I called your attention to just now; this is Section 2: “The Metropolitan Board of Works, for purposes of this Act, may construct any work through, along, over, or under the bed and soil, and banks, and shores of the River Thames, making compensation to all persons having any interest in any wharves,” and so on. You had that power, had you not; were those powers given you in that Act much greater than anything you require to have with regard to the Thames under this Bill?—I should have thought they were the same; if in constructing works we interfered with the navigation of the Thames, we had to obtain the consent of the Thames Conservators; so we have under this Act.

744. First of all, so far as interfering with the Thames and Conservators go, was what you were empowered to do under this Act, and under that clause, as great or greater than what you seek to be empowered to do under the clause of the present Bill?—Much the same.

745. That being so, the clause was put in for the protection of the Conservators of the Thames in that Bill; just look at that clause?—Yes.

746-7. Will you read that clause; if the Committee look at Clause 14 of the Bill, they will see whether this clause, preserving the rights of the Conservators, is not exactly the same as the clause put into the former Bill to preserve their rights when similar powers were given?—I am now reading Clause 28 of the Metropolis Local Management Act, 21 & 22 Vict. c. 104, “In order to preserve the navigation of the River Thames, the plan of any work to be constructed under the authority of this Act upon the banks, bed or shore of the River Thames, which may interfere with the free navigation of the said River Thames, in writing signed by their secretary before such works are commenced, certifying that the works according to such plans will not interfere with the navigation of the River Thames.

748. Will you read Clause 29, which is parallel to our Clause 25?—“Nothing in this Act contained shall extend, or be construed to extend, to prejudice, or derogate from the rights of the Conservators of the River Thames, or to prohibit, defeat, alter, or diminish any power, authority, or jurisdiction which, at the time of the passing of this Act, the said Conservators did, or might lawfully claim, use, or exercise, so far as such rights, power, or authority, or jurisdiction may be exercised for preserving the free navigation of the River Thames.”

749. You have been asked about cost; you say no estimate has been made of these works?—No.

750. But you said, notwithstanding that no estimate was made, you did not consider that they need come to any very considerable cost?—No; what I stated was this, that whilst I had not formed an estimate of the works in detail, I had formed a judgment of the comparative cost of those works. From practical knowledge of those works, I am able to form an opinion without having gone into a detailed estimate.

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751. Without an estimate, can you give some amount which these works, as you consider, ought not to, and would not exceed?—I cannot name a sum, further than I have done in those reports that I have made, where I speak of a few thousands, or a large number of thousands, according to the character of the works.

752. As to what you would contemplate at the present time, you are not contemplating any works which would necessarily be uniform all along the Thames, but such as in each case would be sufficient to protect the land from inundation?—I contemplate works of a very similar character, varying very much in their nature according to the alteration of the different premises, but all of them works at a comparatively cheap cost.

753. And it would be the interest of the Metropolitan Board, as well as of the District Boards, who have to levy the rate, to consider economy in any plan, and the Metropolitan Board of Works would have the power of superintending any plan of that kind, and to consider economy as one of the principal matters?—Yes, a public body can have but one object, and that is to exclude the tide, and do away with the evil of these inundations, with the least inconvenience to the business which is carried on on the banks of the river.

754. Then nothing of the class of work which we know as “embankment,” such as the “Victoria” or “Albert” Embankment, would be necessary, and nothing of that kind is contemplated by you?—Nothing of that kind is contemplated; anything of that kind would be altogether out of the question, and undesirable in such a case.

755. The work to be done is to have a special object, and that object is simply preventing inundation?—It is exactly the opposite of the large embankment works which have been carried out; they have cleared away the property on the banks of the river in order to secure large public improvements, whilst the work contemplated under this Bill are to preserve the trade upon the river, and at the same time to protect the lands from floods, there being no great public object to be obtained by them.

756. In making an embankment of that kind, there are certain great objects to be attained, such as roads and places for recreation, and frontage, and matters of that kind?—In all the embankments which have been constructed great public thoroughfares were much wanted, and they could only be obtained by the making of those embankments. In addition to that, works which would enable the main drainage to be constructed were required in the Victoria and Chelsea Embankments.

757. But those works are of quite a different character and purpose to these which you now go for?—Yes.

758. You have been asked what benefit the Fulham district in general has derived from the work done; in the first place, the main drainage works benefit Fulham as well as the rest of the metropolis?—Yes; and I may say, with reference to that point, that the cost of taking the drainage of Fulham down to Barking is very much greater than the cost of taking the drainage of any any other part of the metropolis down to Barking; but at the same time it is not proposed to make Fulham pay that extra cost; they derive that benefit, treating it as a general question, and they have had there a very important advantage; their sewage has been taken away to a very great distance, and their district, which is liable to flooding from rain water, has been improved by the floods being carried away, and their drainage has been vastly improved. In respect of drainage, Fulham has derived probably more benefit than most other parts of the metropolis.

759. And the embankments, to a great extent, are essential to the purpose of that drainage?—Yes, the Fulham drainage passes through the Chelsea Embankment.

760. With reference to the expenses incurred by the Metropolitan Board in the general improvement of London, the Legislature has committed in the first instance to the Metropolitan Board the duty of deciding what are metropolitan improvements, and what are proper works to be executed by the Board?—Yes.

761. And the Board in the first instance considers those things?—Yes, and there can be nobody more competent to consider those questions, because every interest is represented at that Board; the interest of the immediate district is represented; and so are all parts of the metropolis, and it is therefore a tribunal at which you are likely to arrive at a fair decision.

762. At

762. At any rate Parliament has committed that duty to them from the first instance?—Yes. Sir J. Bazalgette.

763. But when they have determined on what may be called metropolitan improvements, they have further to seek the sanction of Parliament for the particular improvements which they have originated?—Yes. 9 May 1877.

764. And has it been the general scheme of the metropolitan improvements to construct them through the metropolis, so that all parts of the metropolis should benefit in what is done for the general improvement of the metropolis?—Yes.

765. And you are this very year coming before Parliament with a further scheme for metropolitan improvements, not in one, but in various parts of the metropolis?—Yes, several schemes extending over various parts of the metropolis.

766. And if they were improper, or there was anything to be said against them, they must have the sanction of Parliament before they can be carried into execution?—Yes.

Thursday, 10th May 1877.

MEMBERS PRESENT :

Mr. Ashley.  
Mr. Grant Duff.  
Sir George Elliot.  
Mr. Gordon.  
Mr. Hick.  
Sir James M'Garel-Hogg.

Mr. Locke.  
Sir Andrew Lusk.  
Mr. Mark Stewart  
Mr. Watney.  
Mr. Wilson.

MOUNTSTUART E. GRANT DUFF, Esq., IN THE CHAIR.

Sir Joseph Bazalgette, re-called ; further re-examined by Mr. Cripps.

Sir J. Bazalgette.  
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767. You were asked some questions yesterday and the day before, to the effect that if you raised the bank of the river the flood might be sent higher up in consequence of the larger body of water, and so flood places that were higher up the river ; would that be so ?—No ; I stated first that that would not be so, and then I endeavoured to illustrate it in my answers to Mr. Littler, by showing that if the whole of the water which has been excluded by the formation of the embankments could be put upon the top of the tide, even then the additional height would only be one-third of an inch ; that is a very impossible assumption, and really the effect is nil.

768. It was suggested that the effect of your embanking the river and taking in 50 acres where the flood formerly went over the mud, would be to make the flood go up in a larger volume than if the 50 acres were there to receive it ; is that so ?—No ; the real effect is, that so much less water comes into those reaches ; that when the embankments did not exist, the water coming through the bridges below (take the Victoria Embankment) had to fill the larger space, and therefore in having that space it lowered the surface for the moment ; it creates a more rapid flow by creating an additional head, and that was compensated for by giving the increased flow to supply the increased quantity, sending that quantity into the embankment ; when that lowering ceased to exist, then the flow became slower.

769. Then that 50 acres is removed now from the question for all purposes ; it does not receive the flood water as it comes up, and the water that would go in there has not to go down ?—Quite so.

770. Therefore, it is removed altogether from the calculation ?—It is.

771. Quite irrespective of that, it was suggested that the mere circumstance of embanking the Thames would cause the flood that might overflow it at the lower part of the Thames to overflow at some point higher up. First of all, would the whole amount of that overflow be any appreciable part of the whole volume of the tidal wave that goes up the river ?—No ; it is a mere drop in the ocean.

772. The fact that it overflows a particular point does not help the quantity of water that goes up ; but the same quantity of water goes up, notwithstanding the overflow ?—Yes, it is a fact that, when there is an overflow into the land, then there is an increased quantity coming from below, just as I have described, with respect to the site of the embankments ; the same operation takes place where there is an overflow into the low districts of the Thames.

773. It was suggested that there was some part of Fulham lying at a low level, beyond the point where the metropolitan area would terminate ; and the effect of the embankment would be to send the water over a point beyond where that area

area extends ; you say there is no foundation for such an assumption as that :— There is not the least foundation for any such assumption, and I am sure that no witnesses will be found who have studied the subject to come and say that that is so.

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774. It was suggested that this embanking of the river to prevent the overflow below, might have some effect upon the low-lying banks of the River Wandle, and that the flood might go up further and so affect the level which is low by sending the water over the banks of the Wandle ; would that be so ?—The same remark must apply to the River Wandle, unless you raise the level of the high water in the Thames you cannot increase the tendency to flood in any place to which the tide has access ; it must be dependent upon an increased height.

775. At any rate if nothing were done to the mouth of the Wandle, what is proposed now could not aggravate any evil which may exist from the overflow of the Wandle ?—It would not affect it in the least.

776. But in effect you do propose, do not you, to do something at the mouth of the Wandle which will have the effect of stopping the flood going up there ?—The question put to me was how would works on the banks of the Thames prevent the tide from overflowing the banks of the Wandle. They would not prevent it unless the works were done in the neighbourhood of the Wandle river ; those works might be either the raising of the banks on each side of the Wandle as far as the tidal influence went up the river, or by putting tidal gates across the mouth of the Wandle, which could be closed and prevent high tides flowing up the Wandle.

777. So as to make a continuation of the bank with gates against that part of the Thames where the water comes in ?—That would be where the gates would be ; where the Wandle runs in the gates would be closed against the tide whenever the tide rose above a convenient height.

778. The same suggestion or something very like it was made with reference to the Ravensbourne river, which is lower down the river ; works of the same kind would be put there to prevent the high flow going up the Ravensbourne ?—There, works of a more simple character would answer the purpose. The River Ravensbourne discharges into Deptford Creek, under Deptford Bridge. Now, assuming a high tide to rise into the Ravensbourne above Deptford Bridge, it would be very easy there to put tide flaps at the mouth of the Ravensbourne, similar to those existing at the mouth of the Effra and the Fleet, the King's Scholars Pond Sewer, and other places ; those flaps would allow the water of the Ravensbourne to flow at all times up and down into the river, but prevent the tidal water coming from the river into it.

779. The necessity for that would depend upon an examination of the banks of the Ravensbourne, and seeing whether they are so low that the tide would flow over them at the present time ?—Yes ; I am assuming, which I do not know to be the fact, that there is a part of the Ravensbourne Valley which is liable to floods from the high water in the river ; then that simple remedy can be applied, but the great source of flooding of the Ravensbourne, as I stated, is from the upland water at much higher points, and from mills and dams across the river itself.

780. You were asked a great many questions yesterday from time to time about the estimate of expense, and what you thought these works might amount to ; and you answered that you could give no other answer than what appeared by your letter to the Board ; the estimate would be different, according to what was done in different ways ?—Yes.

781. But assuming now, from what you have heard of the cross-examination, that persons are desirous of knowing more nearly what that estimate may be, have you given directions to have figures taken out which will enable you, before the close of this inquiry, to give an approximate estimate of what the cost in your opinion may be ?—I have. I have taken the sections which I produced to the Committee, showing the works which have been done, and I am endeavouring now, upon those sections, to form an approximate estimate of what the cost of the works requiring to be done will be.

782. I assume that a matter of that kind would take a day or two ?—Yes.

783. But you will endeavour to furnish it at some period during the sitting of the Committee ?—I will endeavour to get as near an estimate as it is possible to get from the data we have.

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784. Mr. *Watney*.] You are going to give us an estimate of the expense; will there be any plan showing what you propose to do all along the banks of the river?—It could only be such a plan and section as I produced to the Committee yesterday; that plan will be sufficient, I think, to show the Committee with respect to any particular property, what is proposed; that is to say, whether it is the raising of a wall one foot, or two feet, or whether it is putting in a slide, or whether it is raising the slip-way, or what is the particular character of the work.

785. Would that plan show how much each property is proposed to be raised?—It would.

786. And where there is at present no embankment at the higher part of the river, it will show what you propose to do above bridge?—Yes.

787. On both sides?—On both sides. I produced that section, and I can from that section refer to any particular point, and I can state the nature of the work that will be required for any particular building.

788. Sir *George Elliot*.] I suppose what you now propose to do is what is generally done in connection with any Bill that is brought before a private Committee, where money is required to be raised; you are going to give us the plan which you have already furnished, and you are going to give us an estimate in connection with it; is that so?—I am going to do so, as nearly as it is possible to do in a work of this character; it is not like a large public embankment, but there is a little bit put in here, and another little work of a different character here; I am going to collect those together, and put down the price of each, and arrive at an estimate as near as possible.

789. So that the Committee will be in possession of your view and your estimate of what the work which is now under consideration will cost?—Yes.

790. You will do it to the best of your judgment?—Yes.

791. Mr. *Mark Stewart*.] Are we to understand that the expense will not exceed the proposed estimate which you will put before us?—I am afraid I cannot say that. To make a correct estimate it is necessary to have a correct detailed drawing of the work to be done, and to take out the quantities. All that I can do is to form a judgment of each particular work, and I believe that I can arrive at a pretty fair estimate in that way; but I think that there ought to be a margin beyond it, certainly.

792. Sir *James M'Garel-Hogg*.] In fact, you give a general estimate?—Yes.

793. Mr. *Locke*.] What do you mean by a margin?—Whenever an approximate estimate is made, I think that there should be a liberal percentage added for contingencies which may arise, but which I cannot foresee in making an estimate of that character.

794. Do you know at all what the amount will be?—No, I do not; but in a day or two I shall be able to name a figure.

795. Sir *George Elliot*.] Perhaps you will oblige us by giving as much detail in the estimate as you can?—Yes, I will; I shall have to get it out in considerable detail.

796. And you must have some time to do it in?—Yes, I hope to be able to supply it in the course of a few days.

797. Mr. *Gordon*.] It will be an approximate estimate of certain definite works to be carried out by the Metropolitan Board of Works under this Bill?—Not so definite that I am prepared to say to the Committee that that is the work to be carried out.

798. But it will show the character of the work which you contemplate, will it not?—Yes.

799. And you will give, I suppose, an approximate estimate of the works which the Board intends to carry out at the present moment?—Yes, it may be that in looking into it I may find a better way of doing it.

800. Mr. *Wilson*.] Do you know any cases of unfinished work that would be likely to cause a greater expense and a greater trade loss than those cases which have already been voluntarily incurred by owners of wharves and buildings; are you aware of any special case of peculiar hardship that will be inflicted in carrying out those works?—No, I think not; the dock entrances where they have to be raised are rather different to the other works.

801. Is



801. Is that at the Millwall Dock and St. Katharine's Dock?—No, there is nothing particularly difficult in their being carried out now, I believe. The South Western Railway Company have raised theirs, and the Tower authorities are raising theirs at the present time, and there are some long lengths now being done. I think they are as difficult as any that would have to be done.

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802. You are a Civil Engineer, and a member of the Institute of Civil Engineers, are you not?—Yes, I am.

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803. I believe your acquaintance with the River Thames commenced in the year 1837?—It did.

804. At that time you became a pupil of Sir Mark Isambard Brunel, and assisted in the formation of the Thames Tunnel?—Yes, and I was subsequently one of the assistant engineers of the Thames Tunnel.

805. From 1837 to 1843, were you constantly engaged upon that work?—I was until its completion.

806. During that period did you from time to time, or those with you, take careful observations as to the time and height of the tides?—The height of the tides was so important in connection with that work that the most careful observations were always taken ; as far as possible, we studied all those circumstances which would affect the tide, in order that we might foresee high tides, and provide against them.

807. That was a work, I take it, which was peculiarly dependent upon your knowledge of the tides, and it was therefore vital that you should properly understand them?—So much so that on one occasion a high tide caused an irruption of the river ; it caused the river to break into the Tunnel and fill it, which interrupted the work for several weeks.

808. During 1843, 1844, and 1845, were you engaged under the direction of the late Mr. Thomas Page in taking soundings of the river?—I was so ; from the time I left the Tunnel I took charge of Mr. Page's office, and under his direction I prepared and made the surveys for the first Thames Embankment proposed by the Metropolis Improvement Commission which sat in connection with the Woods and Forests. I prepared all the surveys and plans for the embankment for which the then Earl of Lincoln brought in a Bill, and I made all the tidal observations, and other observations which afforded the data upon which that plan was based.

809. Did those surveys and soundings extend over that line of the river which lies between Blackwall and Battersea Bridge?—Yes, in 1823, 10 years previous to the removal of Old London Bridge, Mr. Giles, under the direction of Mr. Telford, had taken 61 lines of cross-section across the river between Vauxhall Bridge and Blackwall ; and in the year 1843 I was directed to take careful soundings upon those same lines of section, in order that the different changes which had taken place in the bed of the river during that 20 years might be ascertained, one period being 10 years before the removal of the Old London Bridge, and the other 10 years after.

810. I believe that you also prepared the designs for the Chelsea Suspension Bridge, and the new Bridge at Westminster, under Mr. Page's direction?—I did so, and two other bridges at Windsor, higher up, which were also carried out under my immediate direction.

811. It is the fact, is it not, that the whole of your professional life, from 1837 to 1853, was spent upon works in connection with the River Thames?—Nearly the whole ; of course other questions I had occasionally before me, but nearly the whole of my time was spent upon works in connection with the River Thames, for at that time the question had arisen between the Crown and the then Conservators as to the right of the soil in the river, and an order had been made in Chancery that no works should be executed upon the river by the then Conservators, without first referring them to the Crown for their approval ; all those cases came before me as Mr. Page's assistant. I went to the sites, and examined them, and no embankment or any work of any description affecting the bed or soil of the Thames was carried out at that time without coming under my notice.

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812. I understand

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812. I understand that these 61 transverse sections which you took in 1843 and 1845 were for the purpose of checking those sections which were taken by Mr. Giles in similar positions in 1823?—Not quite to check them, because he was a very accurate surveyor, but to determine the changes which had taken place in the river, consequent upon the dredging operations, and the increased scour; and those comparative sections were published in a Parliamentary Paper in the first and second Reports of the Metropolis Improvement Commission.

813. Is it the fact that Old London Bridge, as it existed prior to 1833, did reduce the sectional area, and obstruct the water-way of the river?—It did, as a matter of fact; the sectional area previous to 1822 was much more contracted; but in 1822 the waterworks were removed, for the pounding up of the water by the bridge was so considerable that the falling water was employed to work water-wheels to supply London with water. In 1822 those were removed, and in 1823 tidal observations were taken by Mr. Montague, the then City surveyor, to see the effect which had been produced on the tidal flow.

814. Those waterworks were the old waterworks which existed by the side of London Bridge?—Yes, they were worked by the fall of water through the arches on the Middlesex side of the river.

815. As to the peculiar obstacle which the bridge presented to the tidal waters, was it produced by the starlings upon which the piers of the bridge were supported?—It was; I obtained in 1848 observations from the Corporation, which had been taken in 1821, and which are shown upon Drawing No. 1 (*producing the same*). The lines apply to certain hours, each of these columns representing an hour in advance of the other column; the dotted line A B shows the height at a certain hour of the water immediately below London Bridge; the whole line C D shows the height of the water at the same hour immediately above London Bridge. In this diagram, Drawing No. 2, I have shown the results. At low water, upon the 29th of July, the water stood on the lower side of the bridge five feet two inches lower than it did at the same instant above, the water falling to that extent through the bridge. The tide then turned below London Bridge, and began running up; at 10.40 it had attained the same level on both sides of the bridge; at noon it had risen to a height of one foot six inches higher below the bridge than above; and that is a measure of the obstruction which London Bridge offered to the free flow of the tide upwards. At 2.18 it was then high water below London Bridge, but there was a difference of seven inches of level; the water still continuing to run upwards. At 2.35 it became high water above London Bridge, the tide having begun to run down below; there was then a difference of four inches. At 3.10 it had attained the same level. At 6 o'clock there was a difference of three feet five inches, and at 27 minutes after 10 you had the same state of things reproduced, there being a fall of five feet four inches through the bridge.

816. Sir George Elliot.] Was this a cataract?—Yes, a cataract which led to serious loss of life; this cataract produced water power to work the water-wheels by which London was supplied with water. These observations were taken by the Corporation of London; they were obtained by me from the Corporation office 29 years ago.

817. Mr. Mark Stewart.] What width were the arches?—The width of the arches of Old London Bridge was very small; the piers stood upon starlings, and the obstruction was so great that a boat could not pass between the arches. Mr. Dance, in the latter part of the 18th century, took away the centre starling, and threw the two arches into one.

818. Then those starlings were very near together?—Yes; this represents a section of the same pier at different periods of time; but the starlings approached so close that wherries could only pass; the barges passed in the centre.

819. Sir George Elliot.] What portion of the old sectional area was obstructed by the piers?—The actual area after the removal of the waterworks was 7,360 feet, as compared with its present area, 17,600 feet.

820. Mr. Bazalgette.] Can you tell me in figures, first prior to 1833, when the starlings were removed, what the exact reduction of the sectional area through the bridge was, as compared with the points above and below the bridge?—I can; 300 feet above London Bridge the area was 19,380 feet; 300 feet below the bridge it was 23,400, and through the bridge only 7,360 feet.

821. What

821. What was the effect of the sudden contractions of the sectional area upon the ebb and flood tides?—I believe I have just explained in detail to the Committee that the flood tide was retarded to the extent of 13 inches on the average; that is to say, that the water did not rise by 13 inches so high above as it did below, and that the ebb tide did not ebb out to the extent, on an average, of 5 feet 6 inches so much above the bridge as it did below the bridge.

822. And I believe that that diagram which you have produced to the Committee illustrates the difference of level between the two points at each side of the bridge at high and low tides?—And intermediate times as well; at the same moment above and below, both at high and low water, and at intermediate hours.

823. The starlings of the old bridge were gradually removed in 1832, 1833, and 1834, were they not?—Very little had been removed in 1832; only such parts as were in the way of the coffer dams for the new bridge; but in 1833, the greater part of the bridge was removed, and by July 1834, the whole had been taken away, and the river brought to its present sectional area.

824. That is to say that the sectional area was increased in 1834, from 7,360 square feet to 17,600 square feet?—That is so.

825. What was the object of your taking 61 transverse sections of the river in 1843; you have already told us that it was to determine the effect of the removal of Old London Bridge, with regard to those 61 transverse sections which had been previously taken by Mr. Giles?—It was.

826. So as to ascertain the exact effect of the removal of London Bridge upon the bed of the river?—Yes, and the effect of the removal of London Bridge was to lower the low-water line. In 1823 Mr. Montague, the then City surveyor, took a complete set of tidal observations, extending from the London Docks to Teddington, for the purpose of putting upon record the then height of the tide, in order that the effect produced by the removal of London Bridge, which then had become a necessity, might be determined. The line *AB*, Drawing No. 3, represents the high water at that time; it shows a fall of 8 inches through London Bridge, as is there shown. It shows the resistance caused by Southwark Bridge which heaped the water slightly up there; it shows a similar resistance at Westminster Bridge which heaped the water up at that point, and then the height of the water successively rose until at Teddington it was about half an inch above Trinity high water; the strong black line representing Trinity datum. The low-water line, *cd*, rose suddenly at London Bridge to the extent of 5 feet 4, as I explained; it was then heaped up by the resistance of Blackfriars Bridge, and a little heaped up by the resistance of Westminster Bridge, and then it continued to rise gradually until it reached Teddington. The immediate effect of the removing of the bridge was to lower the level of the low-water line 5 feet 4. The line *ef* represents the bed of the river, showing the deepest point at each cross section, taken by Mr. Giles in 1823. Of course the scale very much distorted; the shaded hillocks represent the shoals existing in the bed of the river, but which were not impediments to the navigation, because the old bridge heaping the water up, there was sufficient depth of water for the navigation; but when the bridge was removed and the low-water line lowered, then these shoals were discovered, and it became necessary to remove them, in order that the navigation might be maintained.

827. Before you come to the dredging itself, to get clearly all the information you have at hand, in order to determine this question, you also have obtained from the Admiralty and from Mr. Simpson, the engineer of the Chelsea Water-works, tidal observations taken at Sherness and other places?—I have. I shall mention those afterwards, as proving the effect produced by the removal of the shoals. I have now shown the effect produced upon the tide immediately upon the removal of Old London Bridge, and I was going to show that that effect was not so great as it would have been, because of the obstruction offered by the shoals; but when they had been removed by dredging, and the bed of the river reduced to the low line *gh*, as shown by my soundings in 1843, then the obstruction which had been offered by these shoals being taken away, the low-water line became further reduced, as is shown by the lowest line *ij*, according to my observations in 1845; and the high water increased to the extent shown by the line *kl*, which was the high water in 1845. The observations prove as follows: the average is for the whole year, and is deduced from observations which were

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taken at the Admiralty Dockyard at Sheerness ; at the London Docks by Captain Maugham and by Mr. Simpson, the late engineer of the Chelsea Waterworks, on the line marked "Chelsea" on Drawing No. 3. The immediate effect of the removal of Old London Bridge was to lower the water by an inch below London Bridge, to lower it  $4\frac{1}{2}$  inches immediately above London Bridge, and  $5\frac{1}{2}$  inches at Chelsea. As the shoals were gradually removed, the tidal observations taken for the whole year in 1843, compared with those for 1835, show an increased rise at Billingsgate below London Bridge of  $7\frac{1}{2}$  inches ; above London Bridge, at Old Swan Stairs, of 11 inches, and at Chelsea 1 foot. In 1845, as the lowering of the bed progressed, so the rising of the tides became progressive, and in 1845 the tidal observations showed a rise at Billingsgate of 8 inches, as compared with 1823, of  $11\frac{1}{2}$  inches at Old Swan Stairs, of 1 foot 3 at Battersea, of 1 foot 3 at Putney, of 9 inches at Kew, and half an inch at Teddington.

828. I understand the effect of removing these obstructions was twofold on the tides ; first, to lower the level of the low-water line, and to increase the level of the high-water line ?—It was.

829. What was the total increase in the range of tide produced by the removal of these obstructions ?—The increased range varied of course as you passed up the river.

830. Take as a test-point Waterloo Bridge ?—The high and low water added together was 5 feet.

831. Was the effect of reducing the level of the low-water line to render the Thames insufficient in depth for the navigation ?—It was so, and consequently extensive dredging operations were undertaken by the Conservators, the effect of which is shown on Drawing No. 3 ; the shading exhibiting the portion of the bed of the river removed by dredging, and the operation of the increased scour combined.

832. Was the effect of that dredging, assisted by the increased scour, to lower the bed of the river in some cases as much as 10 feet ?—It was.

833. You have already shown us what the increased height of the water line was in the years 1843 and 1845, as compared with the year 1823, at various points, and also the increased depth of the low-water line as well ?—Yes.

834. Now I will come to Westminster Bridge ; was the effect of that, as in the case of London Bridge, to reduce the sectional area of the river ?—It was.

835. To what extent ?—At Old Westminster Bridge the area of the river 200 feet above the bridge was 16,380 ; 700 feet below the bridge it was 19,220 feet ; but through the bridge itself, in 1823, it was 13,030 feet only.

836. Can you give me the increase of the sectional area produced by the demolition of the old bridge and the substitution of the present structure ?—Yes, the immediate effect of the removal of Old London Bridge, and the deepening of the river, was to occasion Westminster Bridge, which had never been a sound structure, to settle with great rapidity. In the 20 years between 1823 and 1843, the sectional area had increased to 17,330 from 13,030. The entire removal of the bridge has now increased the area to 18,434.

837. Has the same operation taken place at Blackfriars Bridge ?—Yes ; at Blackfriars in 1823 the sectional area 200 feet above the bridge was 16,520 feet ; 450 feet below the bridge it was 17,520 feet, and through the bridge it was only 13,420 feet ; the dredging and the natural operation of the scour increased the sectional area through the bridge, so that in 1843 it had become 16,360 feet, and Blackfriars Bridge had also begun to fail from the settlement of its piers.

838. Has the improvement in the sectional area through these bridges had the effect, as in the instance of London Bridge, of lowering the level at low water and raising the height at high water ?—It has had precisely the same effect, but to a reduced extent.

839. Having described the obstructions which existed, and the efforts which have been made from time to time to improve the river, we will now come to the effects produced by flowing tides. You have made the Thames tidal phenomena your especial study for 40 years past ?—Yes.

840. Now, first we will deal with the suggestion that a definite quantity of water is thrown by each following tide into the mouth of the Thames, which, no matter what takes place within the channel itself, must be dealt with within its limits ?—I had before me in 1845 ten years' observations at Sheerness, taken every

every day; 10 years' observations at Shadwell, and 10 years' observations at Chelsea, which I classified and arranged, and they were published in a Parliamentary Paper in the Second Report of the Metropolis Improvement Commission. I studied those tides, and I carefully deduced the laws which govern the tides of the Thames.

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841. First, I will ask this: there is an idea that a definite quantity of water is passed up by each tide, and must find accommodation somewhere, independently of what exists within the channel. Is that a mistaken idea, or one which is founded on fact?—Entirely a mistaken idea; the fact is that a certain amount of tidal energy, or momentum, is delivered at the mouth, which must expend itself, but the quantity of water, of course, is not constant under the same circumstances. This is a tidal chart of the English Channel and North Sea (*producing the same*). The tides of the Thames are produced by two distinct tidal waves; one tidal wave enters from the Atlantic along the English Channel, and the figures exhibit the successive hours at which the tidal wave arrives at different points. Another great tidal wave comes in from the North Sea, and the lines exhibit the successive hours at which that wave arrives at the several points. The English Channel wave does not arrive at the mouth of the Thames until nearly three hours after the Northern Sea wave has been there, under ordinary circumstances; and the influence and effect of that upon the tides is of a very extraordinary character. The diagram, Drawing No. 4, will render that perfectly clear. The strong black horizontal line exhibits the mean level of the sea at the mouth of the Thames. The dotted line, ABC, shows the English Channel tidal wave under ordinary circumstances, rising from low to high water, at the successive hours marked, on the spring tides. The dotted line, CDE, exhibits the English Channel tidal wave, accelerated and increased by a south-west gale; it is accelerated in time, arriving at noon instead of half an hour after noon; it is increased in height by the water being forced up the channel. The broken line, FGH, exhibits the North Sea tidal wave, which approaches from the opposite direction under ordinary circumstances. The broken line, HJK, is the North Sea tidal wave retarded by a south-west gale at Dover, and increased by a north-west gale off Scotland, increased in height and retarded in time; so that whereas in the first case, the crest of one wave, B, had passed previous to the arrival of the other, G, in the second case the two crests, D and J, arrive together. The whole line, LMNOP, is the actual tidal wave which occurs, and which is always the sum of the other two waves combined. If you take at any point the height of the North Sea wave, and superpose it upon the English Channel wave, you have the height of the tide. So that the effect of the wind is to accelerate the English Channel wave, to retard the North Sea wave, and to bring the two together at high water, instead of their being separated by two or three hours, and also to increase the height of each. That is theory. The Drawing No. 5 shows the facts of the high tide of January 1877. Below are the Meteorological Office charts published by the Government; the barometer, the wind, and the weather, for the 31st of December; because the effect of the previous day is that which influences the tide; therefore the 31st of December is put under the 1st of January, and the 1st of January under the 2nd. This drawing refers to the extraordinary tide which occurred on the 2nd of January, and did so much mischief. You will observe that the barometer was falling very quickly indeed over the Thames Valley, that the wind was blowing a south-westerly gale, and that the rain was falling heavily on the district of the Thames. On the 2nd, the barometer had fallen so as to produce a great depression over the Valley of the Thames, the wind still continuing to blow a gale from the south-west, in the English Channel, had set in with a north-easterly gale from the north, producing precisely the conditions required, namely, the south-westerly gale heaping up the water at Dover, and the northerly gale bringing it in from the North Sea, and producing this effect. The chart shows the rain still falling. The effect of the fall of the barometer is to take off from the surface of the Thames 225,000 tons weight, and as the tidal energy has, like all other forces, to expend itself, it had so much less work to do in heaping up the water. The effect of the wind I have already explained, and the effect of the rain was in the same direction; for in the previous month of December,  $5\frac{1}{2}$  inches of rain had fallen at London, and  $4\frac{1}{2}$  inches had fallen at Oxford; so that all the conditions were combined to produce the highest tide, namely, a flood in the Thames, a low barometer, a south-westerly gale blowing from the south, a north-westerly gale from the north, and an easterly wind blowing up the Thames. It was the most extraordinary concurrence of circumstances probably ever known; a westerly gale up the Channel, an easterly

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gale up the Thames, and a north-westerly gale in the German Ocean, a flood in the Thames and a low barometer. It is not, however, an isolated case. This was not the highest tide that ever occurred: the highest tide that ever occurred was that on the 15th of November 1875, when the conditions were almost identical; a depression of the barometer all over London, the wind blowing a gale from the north-west, and the south-west, rain falling, the barometer standing at 28·8 over the Thames, and 29·58 in the district beyond; the difference of a fall of an inch in the barometer took 225,000 tons off the surface of the Thames; that is equal to a rise of one foot of water; an inch of mercury represents nearly a foot of water in weight. If you will allow me, I will read a few lines from Tables published by the authorities of the Hydrographic Office; this being the result of the experience of the Admiralty taken from records which have been kept by them, entirely confirming the views stated by me: "It remains to be noticed that the direction of strong winds, as well as the varying pressure of the atmosphere, considerably affect both the times and the heights of high water. Thus, in the North Sea, a strong north-westerly gale and a low barometer raise the surface two or three feet higher, and cause the tide to flow all along the coast from the Pentland Firth to London half an hour longer than the times and heights predicted in the Tables. Easterly, south-east, and south-west winds produce opposite effects, which will be felt as far down the Channel as Dungeness. On the contrary, at the entrance of the Channel, at Plymouth, and as far up as Portland, south-westerly winds, with a low barometer, raise the surface of the water; and north-easterly winds, with a high barometer, always lower it."

842. Just to sum this up shortly, there are two waves which feed the tidal waves of the Thames; first, the English Channel wave, and the other the North Sea wave?—Yes.

843. The English Channel wave arrives three hours earlier than the North Sea wave?—Under ordinary circumstances.

844. The effect of arriving at different periods, particularly when influenced by a south-west wind, is to make irregularities?—Yes, in the tide of the Thames.

845. These waves run with a certain amount of momentum up the mouth of the Thames?—Yes.

846. And that momentum has to encounter various resistances in its course along the river?—That amount of momentum must be expended in some way; the tide will continue to flow up the river until it has entirely expended its force. It does so in three ways. The first resistance is the friction of the bed in running up the river; the second class of resistances are those offered by such obstacles as London Bridge or other bridges across the stream, and the amount of force which remains after the whole of the work has been done upon those two resistances, is expended in heaping up the water against the action of gravity.

847. Taking the first resistance, I understand you to say that the friction of the bed has been lessened by lowering the low-water line?—Yes.

848. And that resistance, to some extent, has been got rid of?—Not got rid of, but considerably reduced; the velocity of the river being decreased and the sectional area increased, the amount of resistance offered by friction has been considerably decreased.

849. The second resisting force, or that of local obstructions, has also to a large extent been reduced?—It has; the local obstructions caused by the bridges have been removed to the extent in the case of London Bridge of increasing the area two-and-a-half times; and at Westminster and Blackfriars increasing the area one-third.

850. I may take it that the combined reduction of these two resisting forces, the friction of the bed and the removal of local obstructions, has enabled that momentum of the tidal wave to exist for a longer time, and for the tidal water to be passed up in a larger volume, and to a larger extent?—It has. I would wish to observe with reference to the resistance offered by the bed, that there has been a gradual and progressive reduction of that by the gradual and progressive deepening of the river, which is now causing a gradual increase in the height of the tides; because it may be easily understood that the tidal wave, when it arrives at the upper part of the river, if it has to run up a steep incline, will sooner expend its force than if by the removal of obstructions and the lowering of the bed, that incline has been reduced. It is just the same as if a railway train were allowed to run down one incline and expend its force in running up another: the less the inclination of the incline it has to run up the further it will run before it has expended its force.

851. Just



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851. Just as a forcible illustration of the impulsive character of the tide, is not there a crest at high water which comes to London Bridge from Sheerness, at the rate of 30 miles an hour?—Yes, to those who have not studied the conditions of the Thames at any given moment, they are of a very extraordinary character. For example, on the 17th of March 1873, at 50 minutes after 10 at night, from my own observations, the water stood (it being then dead low water) at St. Katharine's Dock about 10 feet 6 lower than it was at Sheerness, and 5 feet 4 lower than it was at Chelsea. The diagram, Drawing No. 6, shows observations taken by me on the 17th of March 1843. At 1.39 p.m. it was high water at Sheerness, the tide was then flowing up, and at that given moment it stood at London Bridge about 8 inches lower, and at Chelsea Waterworks about 32 inches lower than it did at Sheerness. At 3.15 p.m. the water had fallen at Sheerness 5 feet 3, but it had continued to rise at St. Katharine's Dock, and at that hour it was high water at St. Katharine's Dock. The tide was then running downwards from St. Katharine's, and upwards towards Chelsea, at the same instant. The tidal crest had travelled from Sheerness to St. Katharine's at the rate of 30 miles an hour, and as it passed each successive point the water commenced to run downwards on the lower side of it, and still continued to run upwards on the upper side of it; so that it continued to run up for two hours at Teddington, after it was high water at St. Katharine's. At this moment the tide began to fall with great velocity at St. Katherine's, although it continued to rise at Chelsea, and it fell with an equal velocity at Sheerness; so that at 7.33 p.m., when it was low-water at Sheerness, the tide formed the line EF, standing 6 feet 9 higher at St. Katharine's than it did at Sheerness; and about 3 feet higher at Chelsea, and falling rapidly, but it then ceased to fall at Sheerness, and began to rise rapidly there; the low water crest running up from Sheerness to London, as the high-water crest had travelled before, but at the rate of 13 miles an hour; and at 1.50 p.m., when it was dead low water at St. Katharine's, the water was running upwards from Sheerness, but it was still running down from Chelsea; St. Katharine's stood in a depression of about 5 feet 4 below Chelsea, and 10 feet 6 below Sheerness at the same moment. This shows that you cannot deal with the question of Thames floods by level; it is not a question of hydrostatics, it is a question of hydrodynamics; so that the wave expends itself in running up the Thames at the rate of 30 miles an hour; not the water moving, but the crest of the wave travelling upwards; and the low water occurs in the same way, the momentum of the water being sufficient to cause a depression at London Bridge of 10 feet 6, as compared with the water standing in the ocean at the same instant.

852. Sir George Elliot.] What is the velocity of the water when the crest of the wave is at 30 miles an hour?—None; it is slack water; there is no motion at all.

853. Is the crest of the wave an optical delusion?—At the moment of high water, the water is stagnant.

854. Therefore it has no practical operation upon anything which we have to consider; it is merely observation of a phenomenon?—It is a generalisation of the law which you must study as to the cause of the floods.

855. It has neither force nor momentum of any kind?—None; the momentum produces the effects, but the mere travelling of the crest is only a successive record of high water at successive points.

856. Mr. Bazalgette.] In addition to the causes which you have just described as preventing the free influx of the flowing tide, have you also found that the effect of removing the colliers and other vessels formerly lying between Deptford and London Bridge has had an effect upon the tidal water?—It has; formerly, before the construction of the Victoria Docks, and the enlargement of the old existing docks, the colliers and coasting vessels were accommodated in the Pool, moorings being laid down for them; and as many vessels were placed there as would preserve a channel of 300 feet for the navigation. The number of vessels so allowed to lie in the river was 461, between London Bridge and Blackwall; the greater part of the vessels have now been removed, and that has also removed one of the obstructions which retarded the flow of the tide.

857. You find that the upland water which is sent down in times of excessive rainfall has also had an effect in raising the level of the tides?—Yes; the improvements which have taken place in the drainage of the upper part of the Thames Valley have tended to bring down larger quantities of water, and to



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bring it down more rapidly, and that has also increased the height of the high water.

858. May we shortly sum up the causes of flooding in the Thames, by saying first, that they are produced by the friction of the bed having decreased; by local obstructions having been removed; by the vessels which formerly laid between Deptford and London Bridge having been taken away; by the increased amount of upland water sent down; and by the improvement of the drainage of the Valley of the Thames?—Yes.

859. Having explained what the causes are that have produced floods, I will ask you whether the Thames Embankment has in any way contributed to such overflow?—In my opinion, certainly not.

860. Has the substitution of solid ground for water, in the case of the Victoria, Albert, and Chelsea Embankments, in any way contributed to the overflow which has taken place?—It has not. I have carefully calculated the quantity of water which the Thames Embankments have excluded, and the quantity of water which enters the river on the occasion of such a high tide as that which occurred in January. I may state that the effect of the increased quantity of water which was admitted between London Bridge and Teddington Lock, by the deepening of the river, and the removal of obstructions, between 1823 and 1845, amounted to an increase of 34 per cent. in the total quantity; that the quantity of water which is abstracted by the embankments under ordinary circumstances is 587,090 tons; but on the occasion of the extraordinary tide on the 2nd of January, the abstraction amounted to 909,100 tons; but the total quantity of tidal water in the Thames on that day amounted to 574,463,880 tons; and when allowance is made for the water which overflowed the low-lying districts which were flooded, the quantity of water excluded by the embankments was only 1-800th part of the whole quantity which entered the Thames.

861. To pass on; will you tell me whether there is anything in the suggestion that the effect of the construction of the embankment has been to deflect the tidal current to the opposite side of the river?—Certainly not. A stream always endeavours to run in a straight line, and if the river bends it keeps impinging against the concave side in its efforts to preserve a straight line; it always flows along the concave side of the river. Before the embankment was made, the wharves projected, and barges occupied the space, both of which did tend to deflect the water into the middle of the stream, but now that a smooth wall has been put, the stream runs along the smooth wall, and there can be no influence tending to deflect it across.

862. Then, what has been the exact effect of the reduction of the width of the river by the construction of the embankment?—The first effect has been to diminish the area of the river by making the embankment; but, inasmuch as the portion of the river that was embanked was more shallow than the other part of the river, what engineers call the mean hydraulic depth, (that element upon which the velocity of the tide depends) was increased; the mean hydraulic depth is the ratio which exists between the wetted surface and the area of the stream; it is easy to understand that a very broad and shallow stream has a much larger wetted surface with a certain area than a compact stream of greater depth and less width. The effect of the embankment was to abstract a considerable proportion of the shallow shore, and, by increasing the hydraulic depth, to increase the velocity of the current. My own observations show that towards the end of the flood tide the velocity is about 1·907 feet per second, and the immediate effect of the embankment in front of Whitehall Gardens was to increase that current to 2·013 feet per second. But the effect also was to diminish the area from 24,870 square feet to 21,600 square feet; and if the velocity is multiplied in each case by the sectional area, it will be found that the quantity of water which passed up was, before the embankment was made, 47,444 cubic feet per second, whereas afterwards it was only 43,490 cubic feet per second; the effect of increasing the velocity, in the first instance, was to diminish the height of the water in the river below the embankment; because the height of the water depends upon the extent to which it must be heaped up, to drive the water up the river; and, if you reduce the resistance, which you do in this case, you diminish the height which the water will be heaped up below that point. Again, the effect has been to diminish the height above, because, although the velocity is increased, the sectional area has there been brought down to the mean sectional area of the river, and a less quantity of water is passed up, and therefore it has raised the surface to a lesser height.

863. Then

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863. Then I understand the result of what you say is this: the effect of the construction of the Thames Embankment has been to reduce the level of the water both above and below the embanked portion?—It has; direct calculation shows that it has.

864. The embankment was part of a comprehensive system, which was designed not merely for an embankment, but also to provide for the main drainage of the metropolis to some extent?—It is so; it provided the means of diverting the sewage from the river; it would have been impossible to construct the low-lying sewers, the main arterial low-lying sewer along the Strand; it was the construction of the embankment which afforded a site for the construction of the main drainage intercepting sewer.

865. Has the effect of the construction of this intercepting sewer through the embankment been that a quantity of water has been abstracted; when I say "abstracted," I mean diverted from the Thames, which formerly flowed into it, which exceeds in quantity the amount which found storage upon the site of the three embankments?—It has; the water companies which supply London with water take out of the Thames above Teddington daily an average quantity of 60,000,000 gallons, or 267,900 tons of water; and the additional quantity of water which is obtained from the land springs leaking into the sewers, from the sewage proper, and other sources, increased that quantity of sewage in the metropolis to 136,000,000 gallons, or 607,140 tons daily. Previous to the construction of the Thames Embankment that water found its way into the Thames in the metropolis, but now it has been diverted to a lower point, and is discharged at Barking and at Crossness. The effect of this has been twofold; first, it has lowered the water, because so much less water has been poured into the river above; and secondly, it has lowered the water, because of being put in in bulk at a point lower down, it offers a greater impediment to the upward flow of the tide, or to the tidal momentum, than it did before; and so, from both those causes it has tended to lessen, and has lessened, the height to which the high water rises.

866. Can you explain why it was an absolute necessity that the embankment should be constructed, if only to provide for the low-level sewage of the metropolis?—I mentioned that you could not have carried a sewer of the requisite depth, and of the requisite magnitude by tunnelling under the Strand. I think, having been engaged from 1837 to 1843 upon the Thames Tunnel, I may speak with some authority about the difficulties of tunnelling; and I should be very sorry myself to undertake to construct a tunnel of those dimensions along the Strand, and to have to be responsible for the compensation which would have to be paid for property damaged by settlement. I would state that the quantity of water which is abstracted daily by the interception of the sewage, exceeds the whole bulk of the three embankments combined; the bulk of the embankments combined is 587,090 tons, whereas the quantity of water daily abstracted by the interception of the sewage is 607,140 tons.

867. Is that 20,000 tons in excess of the cubical contents absorbed by the three embankments?—It is. The Albert Embankment did not absorb any; a larger quantity was excavated than was embanked; a great improvement was effected there by bringing the river to a more uniform width; a considerable portion of the existing bank was cut away opposite the Millbank Penitentiary.

868. The premises which were absorbed by the Thames Embankment, as you know, were business premises to a large extent?—They were to a large extent.

869. And barges and vessels were in the habit of lying at the wharves which existed before the embankment, between London Bridge and Vauxhall Bridge?—Yes.

870. Have you taken statistics to ascertain the number of barges which formerly lay there, before the construction of the embankment, and the effect which their removal by the construction of the embankment has had upon the tides of the river?—Yes; in 1841, and again in 1843, I had observations taken of the number of barges then lying at the waterside premises, because it was a very important question how far the embankment would interfere with trade interests; and the result of those observations was this, that in 1841 there were lying at one time on the Middlesex side of the river, between Vauxhall Bridge and London Bridge, 703 barges, and on the Surrey side of the river, 467 barges, making a total of 1,170 barges. Again, in 1843 I continued these observations for eight days, to get an average, and

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between Westminster and Blackfriars, on the Middlesex side only, that is, upon the land occupied by the Victoria Embankment, the average number lying was 356 barges; and assuming that those barges had an average of 80 tons each, it would amount to 28,480 tons of tidal water, which those barges abstracted and prevented from coming up; and they had a further effect in offering a great impediment to the flow of the tide by the irregular manner in which they projected into the river. I may say that my estimate of the number of barges which occupied that space in 1870, when the embankment was formed, is 600; and that, taking 80 tons each, would make 48,000 tons, or one-twelfth of the water abstracted by the three embankments.

871. Having dealt fully with the causes which have produced floods, and, at the same time, with the effect of the Thames Embankment upon the river, I will ask you this general question, whether, in your opinion, the operations of the Metropolitan Board of Works have increased or diminished the level of the river at high water and low water; has the effect of their operations been to increase the level of high tides?—I think that it has not; I think that the effect either way must be infinitesimally small; but that the balance of the effect must have been to diminish the height of high water for the reasons that I have stated.

872. I believe, without taking you through them in detail, that within your experience many high tides have occurred with the circumstances of which you are personally acquainted?—I have the record here of every high tide that has occurred since the removal of London Bridge.

873. Do you find that in every case, where flooding has occurred, there is a general concurrence of causes, each of which has contributed to produce them?—I do. I find that every high tide has been contemporaneous with a south-westerly gale, changing rapidly to a north-westerly gale. This diagram, Drawing No. 7, shows every high tide which has occurred from 1833, when London Bridge was removed, to the present time. The black horizontal line represents Trinity datum, and the heights of the black column show the heights to which the water rose above Trinity datum. Part of the columns are open, and part are coloured black; the tides ought to rise to a certain height every day according to the relative positions of the sun and moon, and those tides are now calculated with the greatest accuracy, and published by the Admiralty as an authority. The height to which the tide was predicted to have risen on any particular day is shown by the *open* column; the height it actually attained is shown by the *black* column. The *open* column is the height due to fixed causes, the sun and moon; the *black* column is the height due to accidental causes, gales and floods. The tide of January 1877 happened to come upon the top of a spring tide, whereas some of those which were much higher came at the bottom of the neap tide, so that the tide on the 11th of February 1836, which rose 4 feet 4 above the predicted height, only attained a height of one foot above Trinity datum; and the tide on the 12th December 1845, which rose to 5 feet 7 above the predicted height, there being then a flood in the Thames, and a north-westerly gale; the tide of January 1877 only attained a height of 3 feet 4 inches above Trinity high water, and was not at all an extraordinary tide. The highest tide ever known in the Thames was on the 15th of November 1875, and although it attained a height of 4 feet 6½ above Trinity high water, it only rose 3 feet 3 above the height predicted in the Admiralty Tables of that day. This is one of the tides of which I produced the chart, which shows that the Thames was then in flood, that the barometer was then low, and that a north-westerly gale was blowing in Scotland, and a south-westerly gale in the English Channel.

874. Mr. Wilson.] Would it have been possible for any combination of circumstances to have raised it 5 feet 6?—No; because if the extra tide was to run up on the top of a neap tide, it has to be lifted to a much less height than if it had to be forced up on the top of a spring. The quantity of water that will be forced up by any particular tide depends upon the height to which that water has to be lifted; in one case the centre of gravity of the water was only lifted six inches above Trinity datum; whereas in the other the centre of gravity of the water was lifted 3 feet and ½ an inch above Trinity datum. The tide did the same work in lifting the one body of water 3 feet and ½ an inch as it did in lifting the other 6 inches; the

the bulk of water multiplied by the height to which the centre of gravity of the whole has been lifted, expresses accurately the work done in lifting up the water; and that is another reason why the water taken away from the site of the Thames Embankment could never be forced up to the top of high water to flood the upper districts, because the work to be done in lifting it to a superior height would be  $3\frac{1}{2}$  times as great. I have calculated the centre of gravity of the whole water displaced, and the water to cause a flood would have to be lifted  $3\frac{1}{2}$  times as high as the water which has been excluded by the embankment of the Metropolitan Board. The Drawing, No. 8, is very interesting, as showing the tides for about a month in the early part of 1836. It exhibits every day the height predicted for the tide to rise; they follow with great regularity. The neap tides at the time of the first and last quarters of the moon, the spring tides at the time of the full and new moon, the broken line A B shows the height predicted for every tide, and if the tide rose higher, it is shown by the black column; if it fell lower what it wanted is shown by the open column. On the 11th of February is one of the extraordinary tides of which I have spoken; it rose only one foot above Trinity high water, although the total rise above the predicted height was 4 feet 4 inches; but it happened to be a low neap tide. Below you have the direction and the force of the wind; the arrows show the direction in which the wind blew; the figures show the strength of the wind according to the table. On the 30th of January is a high tide, preceded by a westerly gale, changing to a north-westerly gale. On the 11th of February is another very high tide, and you have a south-westerly gale changing rapidly to a north-westerly gale. On the 18th of February is another high tide, and you have a south-westerly gale changing rapidly to a storm from the north-north-west.

875. Mr. Bazalgette.] Now, coming to the present Bill, have you made a careful personal examination of the area which is proposed to be dealt with by the Bill?—Yes, I have.

876. And have you carefully examined the various provisions of the Bill, with a view to see in what way the banks of the Thames within the area are to be dealt with?—Yes, I have read the Bill with great care.

877. What conclusion have you come to?—That without some such power as the Bill contemplates, it would be impossible to compel the whole of the wharfingers and owners of property to raise their banks; and that if at certain points there were defaulters, the work done by the others would be very much vitiated, and the good effect resulting diminished. Of course some good would result, but the water would still continue to overflow the banks at those points; and although the area flooded would not be so extensive, the whole evil would not be remedied.

878. Then do you consider the scheme of dealing with the floods that is contemplated by the Bill is sufficient for the purpose of preventing their occurrence?—I think the machinery provided by the Bill is such as will work well, and will quite suffice for the object sought.

879. Do you see any difficulty in dealing with the various cases which may arise under the provisions of the Bill, assuming that the power sought by the Bill becomes law?—I do not; I do not know whether you mean engineering difficulties.

880. Speaking of it from an engineering point of view?—I do not. There may be certain cases in which some amount of consideration will have to be given as to how best to carry on the works which will prevent the flooding of the district behind, and cause the least interference with the business for which the premises are used; but having carefully examined both banks of the river within the district of the Metropolitan Board, I have seen no case where any insuperable obstacle presents itself.

881. Have you also carefully examined the petitions presented against the Bill, with a view to consider the engineering objections which are raised?—I have.

882. Do you attach any importance to those objections?—I do not.

883. Mr. Bidder.] What do you refer to?—General allegations, such as that the trade would be interfered with and prejudiced. I can imagine cases in which the use of a wharf would be interfered with; but if sufficient consideration were given they might be got over; the worst cases would be those where you have doorways so low that it would be impracticable permanently to raise

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raise the sill of the doorway, and I think a moveable slide might be provided to meet all the circumstances of the case, which would do very little injury to the premises.

884. Mr. Bazalgette.] Would the construction of a general and uniform embankment, in your opinion, be advisable to effect the objects contemplated by the Bill?—I think that such a measure is simply impossible, considering the conditions of the river and the purposes it now serves, namely, a great highway for the commerce of the port. You would take away all the existing waterside premises and convert them into a roadway; they could not be used for the purposes of trade, because a road would intervene between the river and the warehouses; it would destroy all the trade interests in the port of London, and the amount of compensation to be paid alone would make it quite prohibitory.

885. Bearing in mind the requirements, first of economy, secondly, promptness of action, and thirdly, of interference with trade, are the provisions of the Bill in your opinion well designed to effect the objects intended?—I think they are; if you were to substitute for it a great scheme for the entire embankment of the river, of course the construction of that work would extend over a long period, many years; in the interim serious losses from floods would continue, and you would destroy the trade and increase the cost to such an extent as to be prohibitory, whereas the measures proposed to be carried out under the Bill are of so trivial a nature that the cost is hardly worthy of being taken into consideration. When the great result to be obtained is considered the expense will be very small, about two-fifths of the whole has been already done spontaneously in the course of a month or two; and the other works might be carried out equally quickly, and at an equally small expense.

Cross-examined by Mr. Bidder.

886. I do not think I can expend my energy in dealing with all the mass of figures that you have put before the Committee; but I will ask you one or two questions. First, I should like to get the fact with regard to that high flood that you have been describing to the Committee. I think you said that the one in 1875 was the highest?—The one on the 15th November 1875 was the highest tide upon record.

887. That was 4 feet 9 above Trinity?—Yes; 4 feet 6 at the London Docks, and 4 feet 9 in the upper part of the Thames.

888. To what extent did that overflow the banks at the places which it flooded?—It extended from an inch up to, in some places, 5 feet, draw-docks and low places.

889. That would be something very exceptional?—Yes, very exceptional.

890. I think the ordinary amount of overflow was about 18 inches?—That I cannot tell you, but it could be derived immediately from an inspection of the sections that Sir Joseph Bazalgette exhibited yesterday; by multiplying the length of each wharf by the height flooded, you would get a general average.

891. I would rather you do that than me?—I can only give the figures you require by that process.

892. I will not press you to do it unless you particularly wish to do it; you are perfectly satisfied, I believe, with the provisions of the Bill; you told my learned friend that you had studied them, and you think them satisfactory?—They appear to me to be so as an engineer; I do not look at them with a legal eye.

893. You ought to know something about law; had you any knowledge of the Bill as originally drafted?—I have never seen anything but this.

894. You cannot help me to the form of the Bill, as originally put before the Board?—No.

895. As regards the Bill itself, as it is now put before the Committee does it occur to you to be a reasonable and just thing, taking it first upon the question of contribution, that there should be some appeal or some independent tribunal to judge between the Board of Works and the individuals and district boards that are to be charged, as to what is fair and just under the circumstances?—No; and for this reason: that the Board, from its peculiar constitution, being a representative body, and from the fact of its long experience, and from the further fact

fact of the very large staff of able officers and trained officers it has, is, in my opinion, the only tribunal who could properly deal with this matter in such a manner as to give confidence and satisfaction to the public.

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896. I will put a concrete illustration, and not talk about generalities; supposing the question is, as to whether the Board itself, on behalf of the metropolis generally, shall contribute, and if so, how much, towards the expenses incurred by one of the district boards, does it occur to your mind as a right thing that the Board should be the judge in its own case, between itself and the district boards?—It does; inasmuch as the district to be charged would have its representatives there, and would be able to state calmly and quietly all the views which could be laid before the Board; the Board would have no real reason why, if it appeared equitable to them that a general rate should be levied over the metropolis, it should not be done. I see no reason why it should not be the tribunal to whom that appeal should be made.

897. You think, having one individual representative there, who objected to his district being charged, would be enough to protect the district against the views of the other 44, who represent the other districts?—I do. You must consider all the circumstances. It is a question of a large contribution by one district, and a very small one, 1-40th part, by the other; and if such good and strong arguments could be brought before the Board as really made it proper, I have no doubt they would arrive at that conclusion; because there is always an appeal to public opinion. The proceedings of the Board are public; they cannot outrage public opinion.

898. You mean that there is such a total absence of local interests or local feeling in the members of the Board, that they would deal with every question without any bias whatever?—I think that has been their conduct hitherto.

899. Now let me put another illustration; take a case, not of a district, but between an individual owner or occupier of wharfage, and the Board; the question whether he is to be compensated or whether the expenses are to be borne by himself and the Board, or partly by one and partly by the other; is it right that the Board again should be the judge between itself and the individual?—I think so, if it came to them; but I am not a lawyer; it seems to me that the Bill does not disturb existing liability at all. The probability is that the law courts would have to decide whether the wharfowner was liable or not.

900. Do you think that it does not disturb existing liability when the Bill enacts that the Board may order any works they please to be done, or may do any works they please themselves, and charge what they please to the wharfingers and owners?—I have not seen the clause which says that they may charge what they please to the wharfingers; my impression of the Bill is that it does not shift the liability at all.

901. I am glad you have told me that, because it will enable us to see how far you have considered the Bill. You know that when the embankment was made there were a great many wharfingers and a great many trades carried on along the foreshore of the river?—There were.

902. Which were annihilated when the embankments were made?—They were.

903. Probably you are aware that all those riparian interests were compensated, and liberally compensated, under the circumstances?—Necessarily.

904. Why do you say "necessarily"?—Because it is not the habit to take away a man's property and not compensate him.

905. That is where the riparian owners and their interests were absorbed for the purpose of a great metropolitan improvement?—Yes.

906. Therefore, in your judgment, it would be right to compensate them?—Undoubtedly.

907. If it were the case, and I put this hypothetically, that the construction of the embankments have inflicted an increased liability to flooding upon the riparian owners, would you, in accordance with the same principle, agree that it is right that they should be compensated?—No, I should not.

908. Why not?—Because I look upon the embankment as a very large improvement, and I look upon the people still in possession of the banks of the river as being benefited by that river, and liable to the accidents which may happen to that river. If you take the river away from them, it is a totally different thing.

909. All the metropolis is benefited by the improvement of the river; but all

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the metropolis has not an even interest in the work?—One can hardly say that the whole metropolis is benefited by the embankments.

910. Sir Joseph Bazalgette said so yesterday. If, when you shut a man off from the river, in constructing the Victoria Embankment, and injure his property, it was a right and just thing to compensate him, why is it not a right and just thing to compensate a man if it be the case that his property has been made liable to floods by the execution of these metropolitan improvements?—I cannot allow that the embankments have produced the floods.

911. Assume that it has; I put it hypothetically. If it be the case that by the construction of these great metropolitan improvements particular properties have been made subject to flooding which were not subject to flooding before, why is it not a right and just thing that they should be compensated?—Because it is only a part of a system which has improved the river, and from the improvement of which river a man has derived much greater benefit than the injury he has suffered from the flooding.

912. You would set off the advantage they gain by improvement of the river, in common with everybody else in the metropolis against their own particular private injury?—If I were going to assess the compensation to be given to any man, I should carefully consider all the circumstances, and if I found a particular work that greatly benefited him, and very slightly injured him, I should not consider him entitled to compensation.

913. If by reason of the construction of the embankment, or any public improvement, you had produced the necessity for the extension of protective works upon a man's land, do you represent it a right thing that he himself should be made to pay for the works?—You might get erroneous conclusions from any answers you might obtain from me upon such a general question as that. The question of compensation must depend upon all the circumstances of the case, and I decline to give a general opinion founded upon such vague premises as these.

914. I ask a plain question. If by making a public improvement you have cast upon any individual the necessity for executing protective works upon his own property, is it, in your judgment, just that he should be made to pay himself for those works?—You must define what you mean by improvement. I do not look upon the works contemplated under this Bill as of such a character as to be designated a great public improvement; they tend to carry into effect a great public good, but they cannot be described as a great public work.

915. I do not speak of the works under this Bill at all; I ask, if by the construction of a great metropolitan work, for the improvement of the metropolis, you should cast upon an individual the necessity for executing protective works upon his own property, is it just that he should be made to pay for the execution of the works?—It might be or not; it must depend so entirely upon the proportionate good which he, in common with all the rest of the metropolis, would derive from a public improvement, and the particular injury he sustained.

916. You would set off against the peculiar private individual injury, the good he gets in common with the rest of the metropolis generally?—It might be so or not; it is impossible to give a general answer where you have not the facts before you.

917. One or two questions as to matters of detail, which you referred to in your evidence; you talked of the effect of the intercepting sewers in removing a certain quantity of water from the upper reaches of the river; in point of fact, though one of those intercepting sewers happen to go along the Thames Embankment, it was by no means a necessity that the two works should be co-ordinate?—They are for the reason I stated; there was no other site upon which you could have made that low level-sewer.

918. How many main intercepting sewers are there north and south of the river to carry that large quantity of water you spoke of?—There are two other intercepting sewers upon the north side, and one main intercepting sewer with branches on the south side.

919. The portions carried by the south happening to go under the Thames Embankment is a comparatively small portion?—It is one of the highest importance; it is to intercept the Great Victoria-street Sewer, the Scotland Yard Sewer, the Fleet Ditch, and the most important sewers that come down that district, which could not be intercepted in any other way.

920. Do



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920. Do you know how much it does intercept?—I cannot give the actual acreage or the proportion, but I say it intercepted the Victoria-street sewer.

921. If you cannot give the figure say so?—I cannot give it; it is a large and very important district, nearly the whole of the closely built portion of the metropolis.

922. The figure you gave the Committee as to that very large quantity of sewage that was taken out of the river, that was taken away by the five intercepting sewers altogether, some part by one and part by another?—Yes.

923. Five sewers, of which that embankment sewer happens to be one?—Yes.

924. Now I will ask a question about another matter; you said that the embankment had occupied a certain amount of storage room, which otherwise would be filled with water?—Yes.

925. You put that upon the occasion of the high floods as something under 1,000,000 tons?—909,100 tons.

926. Take that quantity, which could otherwise have been stored in the space occupied by the Thames Embankment, and spread over the surface of the river, how many miles of river would it have covered a foot deep?—That depends upon where you put it.

927. I said on the surface of the river?—It would raise the height one-third of an inch,

928. I think you are wrong; it would have covered six miles of river a foot deep?—What point do you take, Teddington or Sheerness.

929. The point where the water was, the point between Blackfriars Bridge upwards?—Then you can easily calculate.

930. It is 33,000,000 cubic feet?—I take the river at 1,000 feet.

931. That would cover six miles of river at that depth, would it not?—About six miles at that point.

932. I should be right in saying that on the occasion of a big flood the storage to be occupied by the embankment, and which before the construction of the embankment was open for the reception of the water, would have held as much water as would have covered six miles of the river a foot deep?—Yes, but you would have been greatly mistaken if you should think it caused the water to rise a foot higher. You are comparing two capacities.

933. I do not compare anything; I ask the question and I get the fact?—A space 1,000 feet wide and a foot deep and six miles wide gives 909,000 tons; that is the fact.

934. Now I will ask about another fact; you told the Committee generally what was the result of the removal of Old London Bridge, and you gave certain figures as to the rise in high water at different points which has resulted; may I assume that those are the mean average results?—They are, they are the results of the mean heights of the tide taken for a long period; for a whole year.

935. You have given me 1845; you have said at the Old Swan Pier the effect of the removal of London Bridge was to make the tide rise 11½ inches higher than it used to be?—That is so.

936. And at Battersea, 15 inches higher than it used to be?—Yes.

937. May I presume that upon the occasion of an extreme tide, the difference would be larger than those figures?—Much larger.

938. Can you give me any idea of what would be the difference before and after London Bridge was removed, in the case of an extreme tide?—I have not the figures before me; it is very difficult to pick out two particular tides and compare them, because in order that the comparison may be fair you must take care that the state of the wind and southing of the moon are the same, and it is very difficult to find two extraordinary high tides where all the conditions are the same.

939. But speaking generally?—Of course the higher the ocean tide the greater the tidal force at the mouth, and the height of the tide is the measure of that, and the greater that is the greater would be the height which the removal of the obstruction of London Bridge or any other obstruction will enable the tide to rise.

940. You have got a table which you put before the Committee, which I think you said was a record of all the high tides for many years past?—Yes, from 1833.

941. Do you find that previous to the execution of the Thames Embankment,

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as a matter of fact, there were floodings in that low district to the same extent and with the same frequency?—The tide never rose so high as it did on the 15th of November 1875, but it rose higher as compared with the height which it ought and was predicted to have risen; more extraordinary tides have occurred.

942. The tide never rose so high in all the period of which you have record, as it did upon that occasion?—No.

943. I am speaking of up the river, not down below; did it ever rise so high as it did on the 1st and 2nd January this year?—Yes.

944. In the upper reaches of the river?—Yes, the 20th of March 1874, which was the next great tide to the one of the 15th of November.

945. That was since the embankment was constructed?—Yes. You asked me if it had ever risen so high before the embankment was constructed.

946. Is there any other occasion since 1870 when the embankment was made of equal importance?—There have been four occasions.

947. Speaking of the portion of the Thames above bridge, do you find any tides comparable with those before the execution of the Thames Embankment?—No; the tides have risen higher since the embankment.

948. Then, whatever theory may say, I am justified in saying that as a fact the tides have risen higher above bridge since the embankment was made than they did before?—They have, and that is due to the removal of Westminster and Blackfriars Bridges.

949. Whatever it is attributable to, that is the fact. We know when Blackfriars Bridge was removed, but Westminster has been removed 20 years; the removal of Westminster Bridge dates back to 1857?—It does; but as I explained in my evidence in chief, the removal of the bridge does not produce an immediate effect. At the time Westminster Bridge was removed, a shoal existed opposite Montague House, which was dry at low water, and, as soon as the bridge was removed, then those shoals had to be removed, and it is the gradual removal of those shoals which has gradually increased the height of the high-water line.

950. I take your answer as to the fact, with the observation that you think the bridge may have something to do with it. Now, I want to ask you a little more about London Bridge. You explained to the Committee, with very great lucidity, the marvellous effect London Bridge had in stopping the tide and acting as a dam; am I justified in telling the Committee that if Old London Bridge had not been removed, these floodings in the upper reaches of the river could not possibly have occurred?—No. Floods did occur before London Bridge was removed, but undoubtedly they would not have risen so high.

951. We must distinguish this, must we not, when we talk of old records, going a long way back, that the foreshore was much lower in those days?—I do not speak of times so remote as that; I mean 1828, immediately before the removal of the bridge.

952. I am justified in saying that but for the removal of the bridge the extreme tides could not have risen within a long way of what they did rise?—Undoubtedly.

953. Probably two feet or two feet six inches is the extreme upon extreme occasions?—Yes, above London Bridge.

954. Therefore Old London Bridge, and the removal of it, is the greatest factor in the question?—Yes.

955. Do you remember the Act for New London Bridge, which was passed by his Grace the late Duke of Wellington?—He took a great interest in it.

956. Do you remember that it was paid for by a coal tax on the metropolis?—It was, and a contribution from the Government.

957. Principally by a coal tax on the metropolis?—It was paid for from three sources, the revenue of the Bridge House Estates, a contribution from the Government, and the coal duties.

958. I do not know whether you remember that it was then opposed bitterly by the Marquis of Londonderry, as then representing the coal interests on the river?—That is not within my recollection.

959. Undoubtedly the removal of Old London Bridge was for the purpose of a general metropolitan improvement?—Undoubtedly.

960. And it is primarily the removal of Old London Bridge which has rendered it necessary to make works such as those which are indicated by Sir Joseph Bazalgette now?—Yes, above bridge.

961. That

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961. That being so, in your judgment is it equitable that those who by the removal of London Bridge for general metropolitan purposes have cast upon them the necessity of protective works upon their lands, should have cast upon them also the payment of those works?—I say yes, and I say yes undoubtedly, for this reason, that the removal of London Bridge was to all those who had wharves above London Bridge of the greatest importance; it rendered the river far more easy for navigation; it made their wharves of at least double the value. Old London Bridge was such an obstruction to the navigation that almost all trade was confined to the part below, and when you removed it you enabled that trade to spread up the river and increased the value of the property in an enormous ratio.

962. It is curious why they oppose it in that case?—They opposed the levying of the coal duty.

962. Your opinion is that though the work was a metropolitan work for the general good of the metropolis, and although it is only these particular individuals who are injured, you are to set off any benefit they share with the others against that individual injury?—Yes, that illustrates what I said about judging about compensation without knowing the circumstances; I think the benefit they derive was far greater than the injury itself was.

964. The cost of the works that it is contemplated to do, you say is not worth considering?—As compared with the public good that will result.

965. Therefore, if dealt with out of the general rates of the metropolis it would be a mere fleabite?—The larger area you spread it over, the smaller it becomes; but it does not follow that because it is small it is just to do so.

Cross-examined by Mr. Williams.

966. Do you know the river frontage at Fulham?—I do.

967. Are there any wharves there?—There are a few wharves near Hammersmith Bridge. I do not know whether they are in the parish.

968. There are two or three wharves in Hammersmith?—Yes.

969. You said, in answer to my learned friend, Mr. Bazalgette, that the measures that were to be carried out under this Bill were of a trivial character?—Yes.

970. To what measures do you refer?—The whole of them.

971. Do you refer to the plans produced by Sir Joseph Bazalgette yesterday?—I do.

972. And what you mean by the word "measures" is that measure?—Yes.

973. You know that the Metropolitan Board of Works is by no means pledged to those measures by this Bill?—There are no works specifically mentioned in the Bill, and therefore they are not pledged.

974. It is quite possible that a change in the constitution of the Metropolitan Board of Works, in the course of years, may entirely alter the measures propounded by Sir Joseph Bazalgette?—I should imagine all the works will be carried out before any change of constitution of the Metropolitan Board of Works takes place; this is a very urgent measure, and must be done immediately.

975. Here is a Bill passed for all time, unless it is repealed; does not the Bill, as it stands, give the Metropolitan Board of Works power in all time to propound any measure they please?—There again, if you ask me from a legal point of view, I cannot give it you; but taking the general sense of it, I should say that when you have carried out the works contemplated under the Bill it practically becomes a dead letter, unless some change of circumstances renders some further works necessary to carry out the same objects. Reading this with the preamble as a measure to prevent the flooding of the river, when you have prevented that, it becomes practically inoperative.

976. When you use the expression "measures of a trivial character and works contemplated," do you mean the works now propounded by Sir Joseph Bazalgette?—Yes.

Cross-examined by Mr. Michael.

977. Do you look upon this Bill as a Bill merely to deal with the Thames as the Thames, or with the tributaries running into the Thames?—I am hardly prepared to answer that question, because I have not inquired of the promoters.

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I believe

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I believe it recites the words, "any stream or river"; but how far it is contemplated that it should affect any other streams than the River Thames I do not know, or what the legal construction might be; how far the tributary streams might be looked upon as part and parcel of the river itself, I cannot say.

978. I thought you said, in answer to a question of my learned friend, Mr. Bazalgette, that you had thoroughly studied the whole question, and the works contemplated to be done under the Bill?—I have; and no works that have been laid before the Committee would affect any tributary stream of the river; they merely contemplate dealing with the banks of the River Thames proper.

979. Will you explain how you would remedy floods coming down into the Thames and affecting the back country, and those very districts which are to be guarded against floods, upon the Thames itself?—There might be one or two modes of dealing with such tributaries; of course those which were mere drainage streams, and not used for any navigation purposes, might be dealt with by tidal valves or flaps, but those which have navigation to any extent upon them might be dealt with more conveniently by having gates which can be opened and closed.

980. Will you explain that, for I really fail to follow you; I will take one instance; you know the banks of the River Wandle?—I am not intimately acquainted with the banks of the River Wandle; I know its position and general character.

981. Are the banks low lying?—Near the mouth of the Wandle, going into the Thames, they are.

982. Are they liable to be flooded?—Yes; I have seen them flooded.

983. Following out the suggestion of Sir Joseph Bazalgette, under the provisions of this Bill, supposing the Thames were to be entirely embanked right up both sides of the river to its embouchure into the River Thames, how would you propose, under this Bill, to prevent flooding in the back country?—It could be effected by the construction of gates at the entrance of the Wandle.

984. Will you follow that out for the moment; I suppose your intention by this Bill, if it is really operative at all, is to prevent any of the back country being flooded, is it not?—You must not go so far as that, because many of the tributary streams are flooded when the Thames is not. I take it that the object of this Bill is to prevent the back country from being flooded by the Thames and through the Thames.

985. The object is not to protect the wharf, whose wall you intend to raise, but to prevent the back country from being flooded, owing to the wall of the wharf being so low as to allow the Thames to escape by means of the wharves into the back country?—The object is to prevent both.

986. The owner of the wharf knows his own interest best; it is not to protect the wharf itself for the purpose of the owner that you intend to raise the banks?—I suppose if a man preferred being flooded the Board might not be inclined to assist him; their object is to prevent all flooding arising from the Thames.

987. If I were a wharfowner and I carried on some process requiring water to be admitted by the tide, for the steeping of flax or any other purpose, by this Bill, if it is operative, you will prevent the water running into my wharf?—No; no wharfowner would depend upon the inequalities of the tides to steep flax.

988. Do you mean that this is something to protect me against myself, or is it to protect others against me?—It is as I understand it, to prevent the whole district from being flooded.

989. It is in fact to prevent the back country from being flooded through the negligence of the frontagers?—And to protect the whole.

990. Will you follow me: I take the Wandle as an illustration; you will have embanked the Thames the one side and the other entirely; when a flood occurs, what will happen to the banks of the Wandle?—There would be less water overflowing the lower part of the Wandle than you had before.

991. Though you have embanked on both sides?—Yes, because you leave only a narrow passage for the water to find its way in and spread over the land instead of leaving the whole frontage.

992. How will you alter the channel of the river?—At present the water flows over the bank all the way; you will then have prevented it flowing over except through the mouth of the Wandle; the quantity of water that can enter is in proportion to the length; and in the proportion that you have reduced the area, so will you have reduced the quantity of water which can enter and flood the district.

993. You

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993. You say it is not necessary to do anything to prevent the floods going up by means of the streams?—Not at all; I took your proposition and said if you carried the embankment along the margin of the river on each side of the Wandle, and left a gap, the quantity of water coming in will be less than now overflows the banks.

994. May I take it that it will not be necessary to do anything?—No; if you want to prevent the lower part of the Wandle from being flooded, you must put gates.

995. Can you answer me whether this Bill provides for that; what happens to the upland waters coming down at the time the gates are shut?—Nothing, because as those gates open outwards they cannot impound water coming in the direction in which they open; they can only be shut when the water outside is higher than the water inside.

996. What will happen, supposing the flow of water downwards is sufficient to flood the country, and you have shut it out from the entrance; what will happen to the water passing down laterally?—Nothing, because you have simply intervened planks of wood between the flood water and the natural barrier outside, namely, the water in the Thames; and if you take them away you would not alter the condition of things.

997. Then it is totally unnecessary to do anything?—That is not a sequence; you asked what would be the effect of flood-gates upon the upland waters coming down.

998. It would not do any damage?—The upland waters coming down would not be affected by putting gates at the mouth of the Wandle, which open outwards.

999. Does this Bill provide for anything being done?—Undoubtedly it covers all necessary work.

1000. Therefore it would cover works up the tidal portions of the streams entering into the Thames?—That, again, is a legal construction, as to which I cannot answer.

1001. I ask you, as an engineer, as to works?—I do not understand it in that way.

1002. As an engineer you have considered all the works which are provided by this Bill; are any works provided for dealing with a flood occurring upon any tributaries of the Thames?—No.

1003. Where there is tidal water?—No; the works which I have considered as being contemplated by this Bill are the works which are described by Sir Joseph Bazalgette in his report of the 4th January, which are shown in the sections that he exhibited yesterday, and they do not, as far as I know, embrace tidal gates or tidal flaps at the mouths of any of the tributary streams.

1004. Do you consider that the works to be done in the nature of a great public advantage?—I do not; if you want to classify them, I should not say that it was in the nature of a great public advantage.

1005. Is it a private advantage?—Yes, it is a local benefit; each particular work is confined to a certain locality.

1006. Do you consider, then, that this is enforcing a liability already existing, or that it provides a new means for enforcing the liability?—As far as my opinion goes, again saying I am not a lawyer, I believe it merely makes clear, and defines and enforces an existing liability.

1007. You think that it would be fair that, by a Bill of this kind, the existing liability of the frontagers to the Thames should be altered?—I do.

1008. You think it right that it should be?—Yes, considering the great benefits they derive from their position upon the river, and that the improvements that have led to these floods have been to them a very great benefit and advantage, their position justifies their bearing the expense of putting the river right.

1009. Would you draw a distinction between the Thames and any other rivers in the kingdom?—Certainly not; the same principles apply everywhere.

1010. Ought there to be any special legislation for the Thames, differing from the legislation applying to all other rivers in the kingdom?—If all the circumstances were the same, undoubtedly not; but it is such a general proposition that I can hardly give an answer that would be valuable.

1011. You can give an answer when I speak of premises from which you are to draw a deduction; supposing at the present time there is no liability upon any river, are there any circumstances in the Thames, making a liability special to the Thames, which does not apply to any other river in the kingdom?—That is a question which I should like to take a much longer time to consider; it is a very large one.

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Cross-examined by *Mr. Philbrick.*

1012. The tides in the Thames, as I understand you, are higher now than they were since the construction of the embankment, and the other improvements that you refer to?—Yes, they are really higher since the removal of the London, Westminster, and Blackfriars Bridges.

1013. So that, in point of fact, the effect of the improvements has been to require greater care to be taken in the construction of premises liable to be flooded?—It has.

1014. That has been the effect of the various works that have been done by the Metropolitan Board of Works or by other public bodies?—No, not by the Metropolitan Board of Works; I consider that the embankment, as I stated in my evidence in chief, has tended rather to diminish the height of the water than to increase it.

1015. Then if the embankment has mitigated the evil, the other works have increased the evil, to an extent which the embankment does not countervail?—They have created it.

1016. The embankment has only partially countervailed it?—The effect is infinitesimal either way.

1017. If the modern state of things has created this obligation, do I understand you to say that the wharfowners should pay for the effects caused by it?—I think so, because the very improvements which have led to and occasioned the floods have been to them a most considerable benefit.

1018. Do I understand that you would set off the benefit which the wharfingers derive from the improvements against the expense that they are to incur in order to protect their back neighbours?—Yes; the facilities which the river afforded them, and the privileges they enjoy by reason of being upon its banks, constitute a kind of responsibility or onus upon them of so keeping and maintaining that river as that it shall not occasion serious injury to other districts behind them.

1019. Do I understand you that, as a general proposition, you think the position of the frontagers entails a liability upon them?—That is my general opinion, but I say that I have no knowledge whatever of what their legal status may be.

1020. Excuse me for saying that I perceive by your answer that you have no knowledge or appreciation of what the legal point is; that is your idea of what is just and fair?—Yes.

1021. When you say the advantage they derive from their waterside property, do you mean the advantages they derive from having water access to their premises?—No; when you raise the question of whether they should bear the expense of preventing these floods, then I say it is not because they have the general privilege of being upon the river, but because the very causes which prevent the floods will also cause a benefit to them.

1022. How does the flood benefit them?—Not the flood; the causes which have led to that also created greatly increased facilities for the navigation of the river; the removal of the great barrier which there was to the free access to all their wharves, and communication with the Lower Pool.

1023. And made the wharves so much the more valuable property?—Yes, it has created additional value to that property.

1024. Take the case of an owner who bought his wharf or inherited his wharf five years ago; he had to pay the market value for it, and for the additional benefit conferred you are going to tax him because he had paid for it?—That is just so; any answer that I give to such general premises may lead to very erroneous conclusions, and even the most equitable laws may sometimes bear hard in one particular case; you can only legislate for the general good and advantage; you cannot insure that no injustice shall be done at all.

1025. I have pointed out a case where you admit injustice, but if you are going to tax the wharfingers and owners of riverside property, because of the improvement in the navigation, owing to the removing of those obstructions, would not the proper time to have raised the question have been when the obstructions were being removed by Parliamentary authority?—I do not quite follow you.

1026. If public works were going to be executed which were going to confer a benefit upon the river at large, it would be right that the parties who were to reap the benefit should be taxed at the time, and not be afflicted in some way afterwards?

afterwards?—When the Act was passed for building London Bridge, no person foresaw the changes which were going to take place in the river; it is true if you look into the “Philosophical Transactions” and other works, you find speculations as to what might be the possible effect, but nobody foresaw what was going to happen upon the river 50 years afterwards.

1027. I take it that that is so; it was utterly unforeseen. As to the wharfingers and the wharves generally, is the increase of value that you put upon them in respect of which you tax them due entirely to the improvement of the river?—I should say not, inasmuch as the property away from the river has risen very considerably in value, and the same causes would not operate upon it.

1028. Then you do not consider that the absorption of any riverside property by the embankment has had a tendency to increase the value of the wharf land?—It may have had that tendency, but there is a counteracting influence in the extension of docks; the tendency has been to divert the trade as much as possible from tidal rivers, and put it into docks, and in some respects it is more convenient for the trade itself.

1029. Are you aware of the fact that all this property has risen greatly in value in the last few years?—Yes.

1030. And it is almost impossible to procure it?—In common with all the metropolis.

1031. Riverside property particularly; there is none of it to be let?—No, that is too general. Having made a survey of the river lately, I have seen several boards up “To let.”

1032. Wharf property?—Yes.

1033. But not in the part I represent?—I do not know where that may be.

1034. The part between Blackfriars Bridge and London Bridge, there it is very exceptional, as you know?—It may be so.

Cross-examined by Mr. Pember.

1035. Do you know whether the Limehouse Board have done all that is necessary to do in their district for the purpose of stopping the floods?—I do not.

1036. You do not know that they have not?—No, I have no knowledge upon the subject.

1037. On the supposition that they have, do not you think that it would be very hard that they should, having spent all the money that is properly attributable to their district, be taxed again?—I should think so. I do not see how under this Bill (but I do not know the legal construction) they could be taxed.

1038. That I must leave; if they could be taxed under the Bill, you think it would be wrong?—If you have no works to execute and you derive no benefit, I certainly think so.

1039. I heard you tell my learned friend Mr. Bazalgette that you had considered the machinery of this Bill, and you thought it satisfactory for stopping floods?—Yes.

1040. Do you mean the engineering machinery?—Yes.

1041. Where is it?—I meant having examined the river and seen the sections which Sir Joseph Bazalgette produced, and having read this Bill, I considered that the Bill contains all that is necessary to enable those works or any further works which might be necessary, to be executed.

1042. By somebody?—By somebody.

1043. When you were speaking of “machinery of the Bill,” you did not mean any act that was to be done, but you were satisfied with the provisions of the Bill so far as regards those who were to carry the operations, whatever they were, out?—I hardly follow the question.

1044. I mean that there is nothing whatever in the Bill as to any work to be done?—There is no work specified.

1045. And the only thing mentioned is the class of people who are to alter the works?—It provides the means of compelling that to be done which at present is not being done.

1046. How do you know that it cannot be done at present?—Because it is not done; one draws an inference from that, and that the two clauses of the original Act which are recited here have been in existence a long time, and have not produced the result desired.



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1047. In other words, simply because the thing has not been very well done, you think it cannot be done?—I imagine that a matter so obviously necessary, if it could have been done, would have been done.

1048. It strikes me, after all, the sanction you are good enough to give to the arrangement of the Bill is not given in your capacity as an engineer?—It is entirely.

1049. But it does not want an engineer to come and tell us that the Board of Works are the best people to order certain things to be done?—As they are engineering works, I think an engineer is the best person to consider and determine who is the most competent body to carry out such works.

1050. You do; I should have thought, on the other hand, he was an excellent person to tell us what works were to be done, but that he was not better fitted than anybody else to come and tell us who should do them?—I think he is.

Cross-examined by Mr. *Armstrong*.

1051. You are well acquainted with the whole of the Thames which is to be affected by this legislation?—Yes.

1052. Are you acquainted with St. Olave's district?—I know the situation of the St. Olave's district.

1053. Have you any idea what works will have to be done in St. Olave's district if this Bill passes?—The character of the works, as shown expressly upon Sir Joseph Bazalgette's section, would consist of raising certain wharves, and the sills of certain doorways.

1054. The gist of your evidence as to works is, that the works required to be done to keep the floods out are of a very trifling nature indeed?—They may be fairly described as such.

1055. If you have a sliding door, and the police see that the door is shut at proper times, that is all that is wanted?—No, that in combination with raising the walls and banks.

1056. If these works are so trifling, why do you want all this elaborate machinery which is proposed to be given by the Bill?—Because, although a very large proportion of persons have done it spontaneously, a very large portion do not do it, to the injury of their neighbours and those behind them.

1057. Why do you want power to take land, and power to order other people to take land, and have a stringent and arbitrary power given to the Board of Works, if all that is wanted is to do works of a very trifling nature?—I can imagine cases where works might be rendered less available, and possibly the works urgently required might not be able to be carried out for the want of the power of dealing with land compulsorily; it would certainly render any measure very incomplete if the powers were not full and ample. When you go for a Bill to effect certain purposes, I think it should cover all the circumstances which can arise.

1058. You can imagine cases you say, but it is a case of imagining; have you in your mind any probable works of such magnitude as require any of the powers asked for by the Bill?—I have not.

Cross-examined by Mr. *Rickards*.

1059. You referred in the beginning of your examination in chief to a dispute between the Crown and the then Conservators of the Thames about works to be done in the bed and soil of the river, and to an order in Chancery to the then Conservators, not to do anything without the consent of the Crown?—Yes.

1060. Are you aware that by the Conservancy Act of 1857, all the rights and estates of the Crown to the bed and soil and shores of the River Thames were vested in the Conservators as created under that Act?—I am; that is the Act which was passed to solve the difficulty of this contested question.

1061. So that the Crown withdrew all its rights to the estate in the bed and soil of the river in favour of the Conservators?—I believe it did. The Crown was properly represented in that Bill, and so merged all its interests.

*Friday, 11th May 1877.*

MEMBERS PRESENT:

Mr. Ashley.  
Mr. Grant Duff.  
Sir George Elliot.  
Mr. Gordon.  
Mr. Hick.  
Sir James M'Garel-Hogg.

Mr. Locke.  
Sir Andrew Lusk.  
Mr. Mark Stewart.  
Mr. Watney.  
Mr. Wilson.

MOUNTSTUART E. GRANT DUFF, Esq., IN THE CHAIR.

Mr. Henry Law, re-called ; further Cross-examined by Mr. Rickards.

1062. I CALLED your attention yesterday to the Thames Conservancy Act, 1857 ?—Yes.

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1063. I suppose you are acquainted with the Victoria Embankment Act ; you know the powers that it took as regards the embankment, and you know what was done under that Act ?—I do not think that I have ever read the Act.

1064. You are aware that it was an Act which authorised the construction of the embankment ?—I am aware that there was an Act for that purpose.

1065. Let me read the 65th Clause which saves the rights of the Conservators ; it is the Act of 25 & 26 Vict. c. 93 ; the Clause is, " Except as herein expressly provided, nothing in this Act contained shall extend, or be construed to extend, to prejudice or derogate from the rights of the Conservators of the River Thames, or to prohibit, defeat, alter, or diminish any power, authority, or jurisdiction, which at the time of the passing of this Act the said Conservators did or might lawfully claim, use, or exercise." You are aware that there is no limiting the power of the Conservators, so far as regards the navigation of the Thames, to navigation only ?—Yes.

1066. Are you aware that under that Act, and in consequence of the various rights and properties which were ceded to the Metropolitan Board of Works, by the Thames Conservators, a sum of money was paid to the Thames Conservators ?—I was not aware of that.

1067. Are you not aware that over 20,000 £. was paid to them ?—No.

1068. You probably remember the construction of the Albert Embankment on the other side of the river, on the south side ?—Yes.

1069. Do you know what the saving clause in that Act was ?—No, I do not.

1070. " Except as herein expressly provided, nothing in this Act contained shall extend, or be construed to extend, to prejudice or derogate from the rights of the Conservators of the River Thames, or to prohibit, defeat, alter, or diminish any power, authority, or jurisdiction, which at the time of the passing of this Act the said Conservators did or might lawfully claim, use, or exercise." There is no reference there to navigation of the river only. Are you aware that under that Act a sum of nearly 5,000 £. was paid to the Conservators by the Metropolitan Board of Works for the rights and property of the foreshore ?—No, I am not.

1071. Do you know the Act of 1868 ; the Act for " Altering the streets, in communication with the Embankment on the north side of the Thames, for giving effect to an arrangement with the South Eastern Railway Company with respect to the pier at Hungerford, and to an arrangement with the Metropolitan District Railway Company, and for amending some of the provisions of the Acts relating to the embankment on the south side of the Thames, and for other purposes " ?—I do not.

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Cross-examined by *Mr. Pembroke Stephens.*

1072. I think, yesterday, in your evidence you referred to a series of tables and a set of tidal observations, showing how the tide had been heaped up at different points?—I did.

1073. You mentioned how it had been heaped up at Southwark Bridge by the resistance caused, and similarly at Westminster Bridge, and so forth?—Yes.

1074. At each of those points, according to those observations, the water was heaped up?—Not at Southwark, at Blackfriars and Westminster.

1075. Will you describe exactly the process which heaps up the water at those points?—The process is this: the piers of those bridges not having been carried to a sufficient depth, the bed of the river there stood considerably higher than in the intervening spaces, and the piers of the bridges standing in the middle of the stream also offered some obstruction.

1076. In other words, they narrowed the waterway, did they not?—It was not by narrowing the waterway, because it is a very different thing to narrow the waterway simply by putting an embankment upon the side, and by putting a great number of piers in the middle. As I explained yesterday, the velocity of the current depends upon the ratio which the wetted surface bears to the area; if you merely put one line in, you may, as has been actually the fact, increase the hydraulic mean depth.

1077. I am now simply upon the Southwark and Blackfriars Bridges?—I am explaining precisely why it was not merely the narrowing which produces that effect.

1078. I will come to the area of wetted space afterwards, but is it not the fact that at each of the bridges in succession there was, as you put it, a resistance and heaping up of water at that point?—There was.

1079. To that extent would the water be heaped up?—At Old London Bridge it was heaped up 5 feet 4.

1080. It would of course be a local heaping up?—It was a heaping up that extended the whole of the way upwards from that point.

1081. But it was 5 feet at that point?—Yes.

1082. It would hardly be a fair way of putting it to calculate the water that was heaped up at that point, as distributed over the whole length of the river?—Yes, at Westminster it heaped it up 3 feet 6.

1083. Whenever you find a bridge and an obstruction you find heaping up?—Yes.

1084. Do you know what the width of the waterway is at Southwark Bridge?—I have not the figures here; the centre arch is 240 feet, and there are two other arches of somewhat less waterway, 210 feet each; that would make it about 660 feet.

1085. And the water, whether you call it wetted area or anything else, has to find its way through a space of 660 feet?—More or less.

1086. Do you know what the width is through which the water finds its way at Nine Elms?—You mean immediately by Vauxhall Bridge.

1087. At the narrowest point of the river at Nine Elms?—It would be about the same.

1088. And do you know what it would be at Wandsworth?—At Wandsworth it would be still less, about 400 feet.

1089. And between those points it is considerably wider, is it not?—There are many points where it is considerably wider.

1090. Is not this the result that between those points you have wider basins, contracting into throats at those points?—That is so.

1091. You mean when the water passed through Southwark Bridge, where it heaped up?—Not at Southwark; Old Blackfriars Bridge was where it was heaped up, and Old Westminster Bridge.

1092. It shows the result caused by Southwark Bridge, which heaped the water slightly up?—There is a certain loss at high water at both Southwark and Westminster, as you see by the blue line upon that section.

1093. Is not the water heaped up at Southwark Bridge now?—Yes; you are speaking now of high water; you must keep them distinct; the high water is slightly heaped up at Southwark Bridge.

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1094. The river below Southwark Bridge is considerably wider than 660 feet, is it not?—No, the narrowest part of the river is not through the bridge; there is a portion of the river close above Southwark Bridge which is narrower than Southwark Bridge itself.

1095. But immediately below that point, it is considerably wider?—It widens out gradually.

1096. Then there is a basin of water below Southwark Bridge which has to come through the narrow throat, at or near Southwark Bridge?—I do not understand that.

1097. There is a larger wetted area, I call it the basin; you call it the wetted area?—There is a larger wetted area below.

1098. As you pass through Southwark Bridge, and between it and the next narrow point, is there not a considerably larger basin, or wetted area?—Yes.

1099. In which the water has space to spread out?—Yes.

1100. And then it has to contract again through the narrow space at Nine Elms?—Yes.

1101. And then it has a larger space in which it spreads out again, and again contracts at Wandsworth?—Yes, but let me explain that you must not take the width alone as indicating the area through which the water flows, because if you examine the section you will find that frequently the want of width is compensated for by the increased depth.

1102. That is a matter of actual fact, which we shall have; I am only dealing at this moment with the physical conditions of the width of the river; I think you stated that when the archways at Blackfriars Bridge were widened the resistance to the river was diminished?—Yes.

1103. And similarly with regard to other cases?—Westminster and London Bridges.

1104. The heaping up was diminished, and the flow of water afterwards was freer and quicker?—It was so.

1105. Supposing you had reversed the operation, and in place of widening the openings you narrowed the openings, would not the effect have been exactly the reverse?—Yes; I think I should explain, in order that a general conclusion should not be drawn from that answer, that it is only if you had narrowed the several arches. You must not take it that necessarily when you narrow the river you diminish its current, because in the particular case where it has been narrowed by the embankment, you have increased the current and the velocity.

1106. You said widening the arches quickened the current, and the narrowing of the arches would have had the contrary result?—Yes, that is applying it to the arches.

1107. By arches, I mean additional area or water-way; you have spoken of training walls as facilitating and quickening the flow of the river?—Yes.

1108. And as delivering a greater quantity of water higher up in a shorter space of time?—No.

1109. The same quantity of water?—A lesser quantity of water. I distinctly stated a lesser quantity of water, and explained why, in my examination in chief.

1110. Let us keep to the same quantity of water; what would be the effect of a training wall upon the same quantity of water flowing up; would it not be to increase its velocity at the point above the training wall?—Yes, to increase the velocity of the stream.

1111. And thereby to send an increased quantity of water, either the same water in a shorter space of time, or a larger quantity of water in the same time?—It would not send a larger quantity of water in the same time, because the area would be diminished; the same operation which trained the river increased the velocity and diminished the area in a larger proportion, and consequently reduced the height below and reduced the height above.

1112. You cannot have it both ways?—It is both ways.

1113. Either the narrowing of the river obstructs the water going up, or it does not?—It diminishes the obstruction and diminishes the area, it lessens therefore the height required to drive the water through, and that diminishes the quantity which passes up beyond that.

1114. And quickens the flow?—It quickens the flow in a less ratio than it enlarges the area.

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1115. At the present moment I am not dealing with the consequences to the district in case of floods, when the Thames overflows its banks; from the moment of the overflow the level of the river is affected, is it not?—You mean to say that the water running and finding an escape, lowers the water in the river?

1116. In other words, if the water did not escape, the river would be higher?—No. You may put it this way, that if banks existed——

1117. Never mind about if banks existed; take the river as it exists; a certain quantity of water comes up and fills the river to the brim?—Yes.

1118. And a certain additional quantity of water comes up and overflows; if that water did not overflow but remained within the river, and there were means in the river of retaining it, would not the level of the river be higher?—It would, but not in the increased proportion of the quantity of water; because instead of the water spreading over the land, it would have to be heaped up against gravity; the work done would be so much greater and the effect produced smaller.

1119. You cannot have the water in the river and flooding the district at the same moment; it must be in one of two places. Supposing these floods did not take place and the river was not relieved in that way, would not the effect be that there would be a greater quantity of water in the river, and hence that the level of the Thames would be higher?—I do not understand the question. You say in case floods did not occur; you mean in case the banks were high?

1120. Certainly?—Taking it so, the water would rise somewhat higher in the river, but the doing of that would bring more work upon the tidal wave, and consequently the same quantity of water would not come up as if it could extend itself over the low lands.

1121. The fact remains that the level of the Thames would be raised?—Somewhat, to a very slight degree.

1122. If it was a slight degree there would be a very slight flood, I should think?—No, we are not speaking of the extent of the flood, we are speaking of the increased height which the river would attain if you prevent flooding.

1123. Your works of protection only go a certain length?—That is so.

1124. Supposing that the effect of your Bill is to raise the banks of the Thames, and to hold, as you have just now told me, a greater quantity of water, will not the effect of your Bill be to make things worse above the point where your banks end?—I do not think so, because, as I stated in my evidence in chief, this is not a matter of delivering a certain measured quantity of water into a certain capacity, which, if you put something to displace part of the capacity, must necessarily run over the brim; it is the delivery of a certain amount of force, at the mouth of the river, which has to expend itself in heaping up the water; and whether that water spreads over a large or small area, the measure of the resistance is the height it attains, and very little influence will be produced upon the height of the river by anything preventing it from overflowing the adjoining land.

1125. That is a long answer to a short question; but the fact remains that the level of the tides being increased by your banks at the point where the banks ends, the mischief would be increased?—No, the rise would be quite inappreciable.

1126. It would depend upon the storms in the German Ocean, and all the things that you told us about?—No, the increase would not depend upon that at all; the height it attained would depend upon it.

1126\*. We can calculate that for ourselves, according to the quantity of water and the distances, but you have admitted that if the water cannot flow over the edge the water in the Thames must be heightened?—Inappreciably.

1127. Never mind that, it must be heightened; you have admitted that; you are going by this scheme not to have any general scheme of protection, but as it has been called, a scheme of patchwork?—No, the patchwork applies purely to the appearance that the works will present when finished; at one point it may be a baulk of timber, and at another, a brick wall; but the work itself, as a measure, is a complete one.

1128. Supposing that in any point your patchwork should give way, will not the

the effect of having increased the level of the Thames be, to bring about worse floods than before you increased the level at all?—Yes, and that is why it is so very important that some one who knows what he is about should see that the work is so carried out that it would not give way.

1129. In other words, that it should be done as a general scheme?—No, in other words, that it should be done efficiently, so far as the general scheme altogether went.

Cross-examined by Mr. *Greene*.

1130. You said that the most difficult things to deal with are those wharves where the parties have access to the river through loopholes or doorways?—They present a difficulty, as of course in some cases a permanent raising of the sill would be prohibitory to trade, but there is a very simple way of doing it by moveable slides.

1131. That is applicable only to some cases?—No case has occurred to me in which it would not apply.

1132. That must depend upon the height of the sill above the high-water mark?—No, I do not think it affects it.

1133. In those cases you are assuming that the wharf is otherwise watertight?—No; if it is not, it must be made so.

1134. Is your suggestion that these moveable slides might be used, intended to apply to cases of brickwork wharves with loopholes?—Yes; a wooden wall may be made as watertight as a brick wall, and easier too.

1135. It would be easier to make the wooden walls watertight than the brick walls?—Yes, considerably. Ships built of wood are always watertight; it is very easily done.

1136. Of course the work you suggest, the raising of the sill, would reduce the size of the aperture at present?—If permanently raised, it would.

1137. Do you know how many walls there are with loopholes along the area to be affected by the improvements?—I have not counted them.

1138. Sir Joseph Bazalgette gave me two illustrations of wharves, where the parties had, as he said, loopholes, and had raised the level of the sill according to the suggestion of the Metropolitan Board of Works; do you know whether those were cases in which the parties had cranes?—No, I cannot say; but I saw several cases in which they had been raised. I cannot say that the sills of the loophole had not been raised where there was a crane.

1139. Have you seen practically employed the slides you are suggesting?—I have; it is the ordinary mode of protecting doorways of houses that are flooded.

1140. Where?—You see hundreds of them in Lambeth, and you may see them even as high up the river as Barnes, where permanent grooves have been put and the boards provided for the purpose.

1141. It must depend upon the nature of the business at the wharf?—Not at all.

1142. That would not be applicable to the case where there are boat-building slips?—There other means would be required; if it were very wide, there would be an objection to having merely a slide going into a groove; the more convenient form then would be to have gates, which would be very convenient.

1143. So that the nature of the remedy must depend upon each particular wharf?—Undoubtedly.

1144. And where the wharfinger has a boat-building slip, or a very wide loophole, perhaps brickwork would be necessary?—No, in no case.

1145. In no case by raising the level of the embankment?—No, gates could always be applied in cases in which the slide would not apply; but a slide really takes the place of a caisson; all the dockyard openings to the docks are closed by caissons; and if you give your slide the form of a caisson, whatever was the width, it could go down into its groove and remain perfectly safe.

Re-examined by Mr. *Bazalgette*.

1146. I will not ask you anything about the Conservators' clauses; they are matters for discussion hereafter; first of all, you were asked about the low-level  
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sewer, and you stated that you were unable to give the exact quantity, or the exact proportion of metropolitan sewage which the low-level sewer carried off?—Yes, I said it was a very large proportion, as it intercepted several very important sewers.

1147. It intercepts the western district of the metropolis?—Yes, all the sewers draining westward; the Victoria-street Sewer, the Fleet Ditch, the Northumberland Sewer, and other large sewers which discharged formerly into the Thames, they drain almost the whole of the metropolis proper, the built-over part to the west of the Fleet Ditch, or rather to the west of the City, at Walbrook.

1148. Is that western district a very closely built-over and crowded district?—It comprises the greater part of the City, and it comprises the greater part of the built-over area to the north and to the west of the City.

1149. Does that sewer also take the sewage which is delivered into it by the Chelsea pumping station?—It does, which again receives the drainage from even as high up as Fulham and Hammersmith.

1150. Therefore though the low-level sewer does not take the whole of the metropolis sewage, it takes a very important contribution of it?—Yes, a very large proportion.

1151. Apart from that fact, is it not the fact that the 607,000 tons that you speak of is diverted by the main drainage system, and delivered at points remote from the Thames Embankment?—Yes, it is; it amounts to this, that the bulk of the water, exceeding by 20,000 tons the whole bulk of the three embankments, is not poured into the river as it was before, near Westminster, and so lessens the height there; it is stored and poured in in bulk at a point about 14 miles lower down, where its effect upon the up-flow of the tide would be considerably greater, and therefore it will check the height to which the water will ultimately rise in the upper portion of the river.

1152. As far as I understand your answer, it is that to the extent of 607,000 tons the river in the region of the embankment is relieved, and that that quantity is discharged at a point where it rather tends to impede the tidal flow upwards?—That is so.

1153. My learned friend Mr. Bidder put to you yesterday that if this quantity of 607,000 tons was distributed over a six-miles section of the river, it would stand one foot in depth upon that section—

1154. Mr. Bidder.] No, 909,000 tons?—Mr. Bidder asked me whether, if the 909,000 tons of water which would be excluded from the river by the embankments, when such a flood occurred as that of the 2nd of January of this year, were spread over the surface of the river, with the average width of about 1,000 feet, such as it is at Westminster, it would not occupy a length of six miles, and I made a calculation and found that it would. It is precisely like the comparisons which are often made between the quantity of brickwork on the Birmingham Railway and that in the Pyramids. Mr. Bidder might have put it in this way. If instead of spreading it over six miles we take it as confined to a length of 150 feet, would it not reach as high as the Monument; it is quite true that it would.

1155. Mr. Bazalgette.] Is that a result which could possibly occur in the natural order of things?—It is utterly impossible.

1156. Do you agree with Sir Joseph Bazalgette in his evidence that if you take that quantity of water and turn it into the Thames opposite the embankments, it would represent the raising of the level of the river to the extent of one-third of an inch?—I have myself made the calculation, and it is so.

1157. Mr. Bidder.] But that calculation cannot be true?—I can explain that matter to make it quite clear. Instead of supposing that it was confined to six miles, which of course it could not be, you take what is really the actual and natural case, that it affects the whole river; then the effect produced could not exceed more than one-third of an inch; but really, after all, it is just one of those questions upon which there might be a great difference of opinion as to the effect produced. For instance, if a man sneezes in Piccadilly, would he affect the atmosphere in St. Paul's Churchyard? Of course he would, but the effect would be infinitesimally small; and, similarly, the abstraction of 1-800th part of the whole water is so infinitesimally small that it is not worth mentioning.

1158. Mr.



1158. Mr. *Bazalgette*.] My learned friend Mr. Bidder's proposition, in order to be sound, must contemplate some such sort of miracle as was performed upon the water of the Red Sea?—Yes; you would have to suppose that by some superhuman means the water was heaped up, and confined to a space of six miles, without there being any barrier at each end of that six miles to retain it there, or any force which could have lifted it to that height.

1159. You stated as a fact, and it is a fact, that since the construction of the Thames Embankment the tides have risen higher in the region of the embankment than they had previously; that is so?—Yes.

1160. Does that apply simply to the region of the embankment, or does it apply to other parts of the river remote from the embankment?—It does not; it applies to the whole river, and the diagram, Drawing No. 5, which I laid before the Committee yesterday, is a diagram of the river at Sheerness. This extraordinary tide occurred at Sheerness, at Harwich, and other places in the neighbourhood of the mouth of the Thames.

1161. Take Sheerness first of all; is the effect of that diagram to show that the water at Sheerness has risen higher since the construction of the embankment than previously to the construction of the embankment?—Yes, it is so. Having had placed at my disposal, and prepared for publication, the tidal observations at Sheerness for 10 years, at the entrance of the London Docks for 10 years, and at Chelsea for 10 years, I find that the tides were entirely sympathetic; that there was no instance whatever of an unusually high tide occurring in London without a similar high tide occurring at Sheerness, it being in fact an extraordinary addition to the tidal force at the mouth, produced from the causes that I yesterday explained; that is the primary cause of the height of the water in the Thames. It is quite true that on the 2nd of January, there were two other causes which may have been said to be local, and to apply to the Thames only; one was the extraordinary circumstance that while a westerly gale was blowing in the Channel, and a northerly gale in the German Ocean, an easterly gale was blowing up the river, which heaped it up, and a very heavy flood was running down the river, which again increased the calamity.

1162. Could the construction of the embankment have had anything to do with the increased height of the level of the tide at Sheerness?—It is outrageous to suggest such a thing.

1163. Is it a sequitur that, because the tide has risen higher since the formation of the Thames Embankment, in the exact region of the embankment, that the embankment has been the cause of such rise?—Certainly not; it could not produce any influence whatever upon the height of the tide at Sheerness.

1164. It has been suggested that inasmuch as London Bridge was an obstacle put down by the public, and the removal of it brought the water up and caused the flooding, that inasmuch as the evil was caused by the public, the public should pay for the cure; you heard that suggestion?—Yes.

1165. Going back to the period before London Bridge existed, there was no such obstacle in the course of the river?—The river was so totally different then, that we cannot draw any comparison; it really was a tidal estuary almost up to London Bridge; it is probable that a great portion of Lambeth and the Isle of Dogs were tidal estuaries.

1166. There was a time when London Bridge did not exist?—Yes.

1167. Then the obstacle of London Bridge was interposed in the course of the stream?—Yes.

1168. That obstacle was put down for the public?—Yes.

1169. And that obstacle has been removed by the public?—Yes.

1170. And therefore the old order of things, or the natural order, has been reinstated?—Yes.

1171. Mr. *Bidder*.] Do you know what the state of things was in 1,200?—I only know through other persons' eyes, of course; I was not alive then.

1172. Mr. *Bazalgette*.] Having regard to those facts, does London Bridge, or the removal of London Bridge, bear the same relation, or bear any relation to a public work, which will be executed and which will cause floods to occur?—I do not quite follow your question.

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1173. London Bridge having been put down by the public, and removed by the public, and so the old order of things having been restored, would that bear any comparison with the public work which has been put down for the public in the bed of the river, and which now causes flooding for a distance?—No.

1174. My learned friend, Mr. Pembroke Stephens, suggested to you that, inasmuch as a greater amount of water, in the case of the Lambeth inundation, found its way over the banks, and into the subjacent district, to that extent the river was relieved of water; is that true?—It is not.

1175. Would not the effect of allowing the water to pass over and get into the district below, be to increase the capacity of the basin or the channel which has to receive the tide?—Every escape which you afford for the water is a lessening of the resistance offered to the tide forcing more water up; if you do not allow the water to escape, the water must remain in the river, and will be an impediment to further water coming up, inasmuch as you cannot get two bulks of water in the same space at the same time.

1176. Is it also true that in proportion as you increase the capacity of the basin or channel which has to receive the tide, so a larger volume of tidal water will be sent up to fill it?—No.

1177. Is not it true?—In a certain sense; the greater the space that has to be filled, the larger the quantity of water that will enter it, but the height to which the water will rise would not be in proportion to the exclusion of that area.

1178. I do not think you quite follow me; I ask whether the effect of allowing a certain amount of water to find storage in Lambeth and not in the channel of the river, would not be to attract or draw a large quantity of tidal water up the river?—It would be to facilitate it by lessening the resistance to the further upward flow of the river.

1179. So that the effect of this discharge into the subjacent district of Lambeth is not to relieve the river appreciably of any quantity of tidal waters?—Certainly it has not the effect of relieving it.

1180-3. I will ask you to assume for a moment that the effect of constructing the works proposed by the Bill would be to confine this water which found vent in Lambeth within its channels; would the effect upon the level of the river be appreciable?—Certainly not.

1184. I have only one other question to ask you; you were asked yesterday what works were alluded to when you said you approved of the works contemplated by the Bill; what works had you in your mind when you gave your approval to the works contemplated by the Bill?—If I understood the meaning of the question it was this, whether, taking into account all the works that would be necessary to carry out the objects desired for the prevention of floods, this Bill gave such powers as would be sufficient for effecting that purpose; and I, having seen the works already executed, having examined the river to see what are the works likely to be required, having seen also the sections showing the works which Sir Joseph Bazalgette has suggested, and having carefully read the Bill, think this will meet every case that can occur, and will be quite sufficient to enable the evil to be effectually dealt with.

1185. In your opinion, will there be a necessity to continue the controlling body even after the works are executed, in order that their maintenance and supervision may be properly looked after?—Obviously, because if these works were allowed to fall out of repair it would then be very necessary that some body should exist who could from time to time inspect them and order such repairs to be made as were necessary.

1186. Mr. Watney.] The learned counsel has just asked you your opinion of the necessity for supervision of the works after they are done; is there any power taken in the Bill for seeing that these boards are put down whenever they are required?—I do not think there is; there is no clause giving that power.

1187. It would be necessary, I presume, to have some power of that sort, supposing that the water was to be kept out by boards?—Very desirable indeed. These high tides usually occur about 3 o'clock, and as often in the morning as in the afternoon, and that would be an hour when no person but the officers specially appointed

appointed would be present to see that the proper precautions were taken; it would be very desirable that there should be some means of insuring that these slides and precautions were always applied the previous night, at those times of the month when high tides could occur; because the sections produced by me show that at neap tides no precautions are necessary; it is twice in a month, for about three days after every new and full moon, that these precautions are necessary, and officers to see them carried out would be very desirable.

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1188. That power you propose to leave in the Board of Works?—It should be with them to take care that such officers were appointed; whether the appointment should be with the vestries or with others is another point, but the Board should have the means of insuring its being done.

1189. And, I presume, in case of omission, there ought to be a penalty or some way of enforcing the Act?—I think that there should be; it is such an important matter, affecting the interests of such a large district, that I think there should be, because it is quite possible that the slide itself may be of little consequence to the person upon whose premises it is, but of the utmost consequence to his neighbour and those behind him.

1190. Mr. Bidder in his examination of you yesterday arrived at this fact, that the land which has been taken away by the embankment has caused a displacement of water, but you said, supposing there was no atmospheric pressure, it would have raised the river a foot for six miles, beginning at Waterloo Bridge. What I want to know is, if you can give us any idea what the action of the atmospheric pressure would be upon that?—I did not say that it was the atmospheric pressure that prevented it. I did say yesterday that the atmospheric pressure had a very important influence upon the height to which the tides rise, and, in confirmation of that, I read a paragraph which had the authority of the Admiralty, and of the hydrographical officers of that department; but I said, as to Mr. Bidder's suggestion, that it was only one of comparative bulk. What would take place would be this, that it would require a different and much larger expenditure of force to transpose the water from the space it would have occupied lower down upon the banks of the river, before the embankment was formed, and to put it up above the top of a tide already four feet above Trinity high water; and that the labour of doing it was directly proportional to the height to which you lift the centre of gravity of the bulk of the water, and it would express a very much larger expenditure of tidal force to heap the water up on the top of a flood than merely to allow it to flow over the low banks.

1191. Am I right in this deduction, that, although the water, if there was no other controlling force, would rise a foot, in consequence of the resistance of raising it higher, it possibly might rise eight inches?—No, it could not rise a foot.

1192. It would not rise a foot if there were no counteracting influence?—No, because Mr. Bidder assumed that it was to be limited to a length of six miles; he had no reason for such an assumption.

1193. I am supposing the same limit?—It is a limit which cannot practically apply in any way; there is nothing at the end of the six miles to retain the water; there is nothing below to heap it up, to force it to that height; and there would be nothing above to retain it and prevent its spreading higher up; you could not do it; you could not force it up below, and you could not retain it above. The force is exerted 45 miles off, and the resistance above can only be gradually spread over the whole intervening area.

Mr. James Abernethy, sworn; Examined by Mr. Cripps.

1194. We know you as a Civil Engineer, as Vice President of the Institute of Civil Engineers, and having had very great experience, I may say for 30 years past, in the regulation of tidal waters and various matters of that kind?—Yes. Mr. J. Abernethy.

1195. And have you for a long period past been well acquainted with the River Thames?—I have.

1196. I want to ask you a question as to what has been stated here about the possible effect of the embankment upon the Thames in the way of increasing floods

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floods at any part: will you just tell the Committee what causes the increase of floods in a river like the Thames?—The increase of floods in the Thames, as in other tidal rivers which have been treated in the same manner, is caused by the removal of obstructions from the bed of the river, such as shoals, and the various bridges which formerly obstructed the water-way, such as Old London Bridge, Old Blackfriars Bridge, and Old Westminster Bridge, admitting a greater volume of tidal water into the bed of the river, and diminishing the friction attendant upon the flood tide; that has tended to raise the level of the high-water surface in the Thames and to depress the level of low-water. In addition to this cause, there is a certain amount due to the land floods, which, owing to the improved drainage in the valley of the Thames, discharge a greater volume of flood water than formerly in a given period of time. These two causes combined have tended to raise the surface level of the River Thames.

1197. Those are all causes entirely independent of any embankment that has been made?—They are.

1198. Would the effect of the embankment add to those causes at all, in your opinion?—It would not.

1199. You know that it has been stated that a certain amount of the area of the river is abstracted from it by the embankment; something like 50 acres?—It has been so stated.

1200. Assuming that to be so, would it have any effect whatever in increasing the flood?—It would not; and setting aside scientific questions with regard to the causes of the increase of floods, I would simply point out one or two facts. A high tide which occurred in June 1875 rose 4 feet 6 inches at the entrance to the Millwall Docks, and although no embankments similar to the Thames Embankment exist at that part of the river, nevertheless the tide rose over the quays of that dock, and has necessitated the raising of the quays to a height of 15 inches above their original level, that dock being between three and four miles below the Thames Embankments. Again, at the Victoria Dock, below Blackwall, or eight miles below the embankments, the tide also rose above the level of the quay of the outer basin, and inundated the adjoining buildings and lands; and they also have been obliged to raise the level of their quays at that point from 18 inches to two feet. All this tends to show that the increased level of the Thames is general, and not confined to the section occupied by the Thames Embankments; there is a general cause followed by a general effect.

1201. Are you speaking of the high tides which caused the floods in London, when you speak of the rise at Millwall and lower down?—Yes.

1202. That being so, in your opinion, would the vertical walls of the embankments, and what has been done to the embankments, be any cause for increasing the flood?—No; the effect of the vertical walls has been to increase the hydraulic mean depth, and to give an acceleration to the current, but inasmuch as the area has been lessened, the increased velocity of the current due to the diminished area does not pass such a quantity of water into the upper reaches of the river as passed up the channel previous to the Thames Embankment being formed when the velocity was less and the sectional area more.

1203. Supposing the Embankment had not been made, and that the old state of things remained, would the friction over the old shallows, and the barges, and so forth in the river have been more likely even to cause flood than the present state of things would be?—In my opinion, if the bed of the Thames had been in its original state during the high flood of June 1875, when you had a combination of flood water from the upper reaches of the river, combined with a high tidal flow, the tendency would have been for the surface to rise higher, having regard to the great friction of the current over the shallow foreshore impeded by numerous barges; all those barges causing deflections in the current, or what are termed eddies, a great cause of retardation to the currents of rivers.

1204. Looking to the future, would you contemplate that the increased drainage and greater protection to the banks of the river from the upland water would increase the downward flow, and might even increase the floods?—My impression is, formed from experience during the past year, in the case of floods in

in various other rivers, as well as of the Thames, that the tendency of the flood water will be to increase. Mr. J. Abernethy

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1205. From the upland?—From the increased improved drainage of the uplands.

1206. And therefore the difficulty might be still greater in the future from that source, if from no other?—It would be so. I may mention that these extraordinary high floods, such as recently occurred in the Thames, have not been confined to that River. In the various rivers entering the Norfolk Estuary, such as the Ouse, the Witham, and the Nene, the same results have followed from the increased action of the tidal current, combined with the great volume of the flood waters; floods have taken place in those rivers which in former times did not occur, arising from the very causes which affect the Thames.

1207. I will ask you a general question, of which we may have more specific evidence hereafter; but I believe you have examined the river generally along its banks, within the metropolitan area, since the time of these floods?—Yes, I have.

1208. In your opinion, would the damage that resulted from the floods there be obviated at a, comparatively speaking, small cost?—I examined the river throughout the whole district, under the Metropolitan Board of Works, on both sides; and I am of opinion that works of a very slight character generally are required to obviate the possibility of damage by floods.

1209. You would not contemplate any very large expenditure by anybody, in consequence of this measure of prevention, would you?—I would not.

#### Cross-examined by Mr. Bidder.

1210. I do not quite understand what you mean when you say that not only in the Thames but in other rivers there has been an increased action of the tidal current generally; do you mean that the moon has got nearer, or something is out of order, or what is it?—No, I mean that obstructions have been removed from the beds of rivers which formerly impeded the tidal flow, and the increased improvement in the land drainage of the uplands has brought down larger volumes of flood water.

1211. You say that the removal of obstructions in the beds of rivers is one great cause of increased tidal action?—Undoubtedly.

1212. And of bringing more water up the river?—I should instance the River Tyne, with which I am well acquainted. The removal of all the various shoals in the bed of the Tyne from the bar to Newcastle has been to accelerate very materially the period of high water at Newcastle, and to raise the high-water level at Newcastle 12 inches.

1213. Just let us keep to the Thames; you say that the removal of shoals brings the tide up?—It admits the tide more freely.

1214. Do you know whether or not, as a matter of fact, one consequence of the construction of the Thames Embankment has been to remove shoals in the course of the river, and deepen its bed?—I am not aware that that is the fact, but the increased velocity of the current caused by the Thames Embankment might tend to decrease the shoals.

1215. If it were the fact that the effect of the embankment had been to remove shoals and deepen the bed of the river, it would increase the tidal action?—Admitting the tide more freely.

1216. In the old state of things, you pointed out that there were a great number of barges lying along the shore?—Yes.

1217. Those were material obstructions, which deflected and retarded the tidal current?—Yes, by causing eddies.

1218. The substitution for that broken line, with all these obstructions in it, of a straight, smooth, vertical wall, is another cause which would tend to increase the action of the current?—The velocity of the current is increased by the vertical wall, but you must bear in mind that I give that answer with the addition of the effect of the land floods and the high tide.

1219. You said that the abstraction of a large area of water, 50 acres or more, which formerly took up a portion of the tidal water, and had to be filled, does not tend to drive the water more into the upper reaches?—It does not.

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1220. Take

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1220. Take a point below the Thames Embankment, which has not been affected at all, say Southwark Bridge, as the narrowest neck of the bottle that you can select?—Yes.

1221. That would not have been altered by the Thames Embankment works?—The bridge has not been altered.

1222. Nor the current through it?—No.

1223. There being the same sectional area as there was before the works were constructed, does not it follow that with the same rise of water below, you will have the same quantity of water pouring through at that point in a given time?—You have, but you must take into account that the high-water level has risen generally in the river, and therefore you have a greater amount of water passing through the bridge than formerly due to that rise.

1224. You agree with me in my question that supposing the same state of things, that is to say, a tide of a given height below Southwark Bridge, exactly the same quantity of water will pour through Southwark Bridge on the flood as did before?—It is obvious that if you have the same channel below the bridge, and the same openings through the bridge, you have the same quantity of water.

1225. Take any given tide with a certain quantity of water coming up to Southwark Bridge the same as before; you will agree with this proposition, that that water must go somewhere?—Undoubtedly.

1226. Formerly part of it did go on to the 50 acres, and that being filled up, it must go somewhere else?—I agree with the former witnesses that the area occupied by the Thames Embankment, which would represent something like 560,000 or 570,000 tons, has been compensated for by the reduction of the water which formerly was passed into the upper reaches of the river now passing through the drainage system of the metropolis to Crossness, and the opposite side of the river, where it is discharged upon the ebb tide, and does, to a certain extent, arrest the flood.

1227. If you have to fall back upon the sewage you are rather hard up; that water which formerly went on to the 50 acres; the 50 acres being filled up must go somewhere else?—It passes up above.

Cross-examined by Mr. *Philbrick*.

1228. With regard to the part of the river which I am more immediately dealing with, the wharves in the vicinity of London Bridge, the wharves immediately below London Bridge on the Surrey side; as I gather from you, there has been no physical alteration in the river itself at that point, which would account for any increased mean hydraulic depth of water?—I have already stated that there has been a general rise in the surface level of the river.

1229. That I understand. I understand you to say that there has been a general increase in the hydraulic depth of the river?—Yes.

1230. I want to know whether it is in respect of any works done in that part of the river, or any obstructions removed, that you attribute that increased depth?—Yes, the removal of obstructions and the removal of shoals.

1231. Where?—Below London Bridge, all the way down to the sea.

1232. Perhaps you will tell me what you refer to?—I refer to the general deepening of the bed of the river from its embouchure near Sheerness up to London Bridge.

1233. When?—Dredging operations are constantly carried on.

1234. Do you refer to the general dredging operations of the Thames Conservancy?—Yes, and others.

1235. You think, as far as any increased volume of water that finds its way up to London Bridge goes, that is due to the removal of such shoals as the dredging has effected?—Yes.

1236. I can understand that the removal of shoals will increase the depth, but is it an appreciable matter or one that must be taken into account?—A very appreciable, because it amounts to this, that the River Thames is now navigable for the largest class of shipping at low water; had the former state of things existed there would have been no navigation of that sort in existence.

1237. Is it not the fact that these dredging operations have been confined to making the channel or fairway navigable for the use of the craft that you refer to?

to?—Increasing thereby the sectional area of the river throughout, and its capacity. Mr. J. Abernethy.

1238. It has kept the fairway open?—Yes.

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1239. It is not the fact, is it, that the area within the banks through which the water or the tideway could extend, has been diminished or contracted below bridge?—If you deepen the river in the centre you increase the inclination of the banks, and you therefore increase the whole sectional area of the channel throughout.

1240. That is scarcely what I ask; it is not the fact, is it, that the area over which the water could expand itself between the banks has been narrowed below bridge in any way?—It has not, as a general rule; it has been deepened.

1241. It has been deepened by the dredging operations of the Thames Conservancy?—Yes.

Cross-examined by Mr. Locke.

1242. I believe you said that you had examined the banks of the river within the whole metropolitan district?—Yes.

1243. And in that case the district of Fulham has come under your notice?—It has to a certain extent.

1244. You have noticed that opposite the Fulham district there are two miles of the river on the opposite bank, not in the metropolitan area?—Yes.

1245. Supposing, under this Act, the Fulham district should be ordered to raise their banks to keep out the water, would it have the effect of throwing the water on the opposite side?—No. You speak of low lands adjoining the river.

1246. Yes?—It would be no use raising the bank on one side of the river.

1247. If we raise the banks on the Fulham side, it would have a bad effect upon the south bank?—No, it would not. I have heard the same argument used as to the Thames Embankments, that their tendency has been to throw a volume of water over to the Southwark side, where no embankment exists. The effect is exactly the reverse; the effect has been that a great volume of the current passes along the vertical concave face of the Thames Embankment, and the velocity upon the opposite side has been proportionately reduced.

1248. Then that portion of the river at Fulham, according to the plan, would be the concave side of the river, the south bank of the Thames?—Yes. All that is the concave side.

1249. Then if the convex side were embanked, the water would flow on to the concave bank, which would not be embanked under this bank?—The great current of the river would be on the concave side, but I am not aware that any embankment is projected there.

1250. Supposing that this Bill should become law; I do not know whether you have studied the Bill?—I have studied the Bill. All that is suggested is, that precautions should be taken by the various existing wharfingers to protect their property; in looking over the works required, I was very much struck with their insignificance throughout. I arrived at a rough estimate in my own mind, that 1 *l.* per lineal yard would cover the expense generally throughout; supposing the work extends over 20 miles, and supposing you take 40 miles, that is only 80,000 *l.* for preserving the whole premises throughout that distance. It only amounts now and then to raising a few courses of brickwork, or putting in a door, or some trifling matter of that sort, involving a very small cost to each wharfinger.

1251. Have you examined the portion of Fulham which is the limit of the metropolitan boundary, where it adjoins Chiswick?—Yes.

1252. The land there is about the same level as at Chiswick?—Yes.

1253. Supposing we are ordered to embank Fulham up to the boundary, would that have the effect of throwing water in flood times on to the adjacent land at Chiswick?—No, it would pass on to the upper reaches of the river.

1254. If it is necessary to keep water out of Fulham, it will be equally necessary to keep it out of Chiswick?—Yes.

1255. If Chiswick was not embanked, the flood would still throw water over it?—Yes.

1256. If the water did overflow it naturally would come round and still come into Fulham?—Yes.

1257. Therefore, practically, it would be no use embanking Fulham unless it was carried on farther?—No.



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Cross-examined by Mr. Castle.

1258. I understand that the Thames Embankment, properly speaking, has not in any way caused these floods?—It has not.

1259. Do you agree with Sir Joseph Bazalgette, that it is primarily the duty of wharfowners to raise their wharves to keep out the floods?—I do; I regard it in this light, that in order to meet the requirements of modern times, and the great alteration in the size of the shipping frequenting the Port of London, it has been found necessary to improve and deepen the river throughout, and the result has been what I have already stated, a general rise in the surface level of the river. I think that it is the duty of the various frontagers or wharfingers to adapt their works to the altered state of things; that is done in various other rivers, and in wharves where similar results have taken place. I could instance the River Tyne; the deepening of the bed of that river has had the effect in certain cases of affecting the stability of the wharves on its margin, but those wharves have been repaired at the expense of the various frontagers, and in cases where they have attempted to force the expense upon the Tyne Commissioners, they have failed. There the same argument was used; it has been necessary for the general purposes of navigation, to improve the river, and it is the duty of the frontagers to adapt their work to the altered state of things.

1260. Have you considered the case of the Clyde at all?—I know the Clyde also.

1261. The Clyde has increased in height owing to the excavation of the bed?—Yes.

1262. I understand that the removing of shoals not only deepens the river but heightens the tidal wave; the water has increased momentum, and therefore the water rises higher and flows down lower?—Yes.

1263. In the case of the Clyde, has the tidal height considerably increased? It has.

1264. Would it necessitate the expense of raising the banks in places?—In many cases it has been done.

1265. Therefore you agree with Sir Joseph Bazalgette, that the wharfowners should do it on their own account?—Undoubtedly.

1266. Do you consider that the wharfowners ought to be compensated?—I do not.

1267. Therefore, if the Bill contains provisions for compensating wharf-owners, that is in excess of what you would do?—That would be in excess.

1268. There are other banks to be considered for the purpose of properly keeping water off London; not only the banks of the Thames but the banks of those subordinate rivers, Deptford Creek, the Wandle, and other rivers; those would require to be looked after in a certain degree, would they not?—Yes.

1269. Therefore a general provision enabling district boards to look after all banks, docks, and wharfs, would be sufficient for the purpose, if properly carried out.

1270. And therefore better than the provisions of this Bill referring to the Thames Embankment?—No. You require a general measure in dealing with the Thames; the effect of trusting the conservation of the river to various bodies is well known with reference to numerous rivers I could instance; I may refer to the rivers in the Norfolk Estuary. The conservation of these rivers is under numerous bodies, and the effect is that no general improvement can be effected, the owners of certain lands desiring to exclude the water from their lands at the expense of their neighbours, and in consequence a Select Committee has been appointed by the House of Lords, with the view of placing these and other rivers under a general jurisdiction. It is absolutely necessary in the case of the Thames that the whole of the banks of the river should be under the jurisdiction of a central body, because one frontager may exclude the tide from his premises; but if his adjoining neighbour does not do so a large district behind may be inundated, and hence the necessity of a general measure.

1271. You do not quite catch my proposition; I perfectly agree with your proposition as far as it goes, that it is necessary there should be some general body  
or

or bodies to supervise the keeping out of the water of the Thames, but does not that necessity for supervision also extend in some degree to the Wandle and other tributary streams, and would it not be a good thing that those powers should be exercised?—That I cannot offer an opinion about.

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1272. You are the engineer to the Thames Conservancy Board?—No, I am not.

1273. I thought you acted for them; that you were familiar with their operations?—I know something of their operations.

1274. I thought I had seen you in some cases in which the Thames Conservancy were concerned; the Thames Conservancy conducts its operations as a whole within its jurisdiction upon the river, does not it?—Yes.

1275. It would not allow or permit the frontagers upon the river anywhere to dredge or deepen the river for themselves?—I am not aware of the powers of the Conservancy Board.

1276. As a matter of fact they would retain the control in their own hands, and not permit a general independent dredging everywhere?—I should think not; injury might result from independent dredging.

1277. You spoke of the outfall of the River Nene?—I did.

1278. In that case you were not long ago recommending a scheme for dealing with a part of the river?—I was.

1279. And you did not succeed?—I did not; but bear this in mind, that though I did not succeed I did not fail on engineering points; it was a financial question with which I had nothing to do.

1280. The plan was a very good one, only Parliament did not pass it?—It was admitted to be a good plan by the opponents of the measure; that was the Wisbech Dock.

1281. Do you find in your operations that the deepening of the river and tidal capacity are the same thing?—The removal of obstructions from the bed of the river, the increasing the sectional area and the tidal capacity, are the same things.

1282. Do you find that the tidal flow practically operates below the ordinary low-water level?—Yes, the low-water level is depressed.

1283. Supposing the deepening reaches a point which the tidal flow does not reach, is there any addition in that way to the tidal capacity?—If you deepen the non-tidal portion of the river, that has nothing to do with the tidal capacity.

1284. The mere deepening of the river is quite independent of the tidal flow, or tidal capacity?—In that way it is.

1285. The operations of the Thames Conservancy are continuous, are they not?—Yes.

1286. Their object is to give a better access to the river, and to admit of the arrival of a larger class of shipping?—That is so.

1287. And the more depth they can command in the river, and the larger the vessels they can get in, the better for the port?—For the port of London generally.

1288. And those operations are continuous?—Yes.

1289. And the more water they can admit the better?—Yes; it is not the mere question of admitting water, but the general conservation of the navigable channel.

1290. And increasing the depth of water?—Yes, to a certain extent.

1291. To that extent, the conditions of the river at the mouth, and near it, are constantly changing in the direction of admitting greater quantities of water?—It has that tendency.

Cross-examined by Mr. Rickards.

1292. After my learned friend Mr. Stephen's questions, I need not ask you whether you are aware that the Conservators are continually dredging throughout the whole length of the river?—Yes.

1293. And it is not left to the owners?—I think not.

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Re-examined by Mr. Cripps.

1294. As to what ~~my~~ learned friend, Mr. Castle, asked you as to the duty of wharfingers or wharfowners, you spoke then of what might be the moral obligation, of course?—Yes.

1295. I daresay you have found in your experience that a moral obligation is by no means sufficient to convey a great number of persons to do things you think they ought to do?—I have.

1296. You want a legal obligation?—Yes.

1297. Unless these wharfingers were at the present time legally bound by a prescriptive right, or some liability of that kind, to repair their banks, you would not think it advisable to rely upon their doing what they are morally bound to do?—Certainly not.

1298. The consequences of any default might be to do some immense injury to persons beyond them, on a lower level?—Yes.

1299. You mentioned what the wharfingers have done on the Tyne; probably you know they are cases where the wharfinger himself was interested in having the work done for the protection of his own property?—Yes, and works of a much more serious character than these; it was a question of underpinning their wharves, and this is only raising them; one is large and the other small, as regards cost.

1300. And you might find some wharfowners, who respect their moral obligation, to do that which is right; but that may be utterly nugatory because their neighbours do not see their moral obligation in the same point of view?—That is found to be the case throughout the numerous rivers in the kingdom.

1301. To pass from that to what you were asked about the Wandle, I do not know whether you know anything about the height of the banks of the Wandle?—I do not.

1302. I daresay you heard it was part of Sir Joseph Bazalgette's scheme to prevent the flood from going up the Wandle by gates?—Yes.

1303. Therefore, so far as any injury done by flood-water of the Thames going up is concerned, the Wandle would be protected, if it is protected at its mouth where it comes into the Thames?—Yes.

1304. That same matter applies to any other stream coming into the Thames where there is the mouth of a stream opening into the Thames; if you can put down any gate to stop the flood-water going up, you prevent the injury up the stream?—It is a very common operation; I do it myself to prevent extremely high tides flowing into docks, by placing reverse gates to exclude them.

1305. As to any overflow up the river in consequence of a bank being raised below, that would not make the height of the tidal wave when it gets higher up any higher than it was before?—No.

1306. The height of the tidal wave would be caused from matters quite independent of what was done for the protection of the banks?—Yes.

1307. And however far we took the bank it could not do any injury, though it might not extend protection to districts beyond?—No.

1308. As far as Chiswick, that is within our jurisdiction?—I believe so.

1309. If there is a point beyond where it is desirable to embank, the conditions of that part, so far as the tidal wave is concerned, would be unchanged from what we do?—Yes.

1310. And anybody who ought to embank above that will have just the same opportunity of doing it as before?—Yes.

1311. As to dredging, one knows that dredging goes on all down the river in many places, and has for a number of years?—Yes.

1312. The entrances to the docks are dredged, and dredging operations are continually going on in the rivers?—Yes.

1313. The Thames Conservancy may dredge, and they do dredge, and other parties dredge—Yes.

1314. And if the operations were merely to deepen the river, nobody would interfere with an operation of that kind?—No, and they have not.

1315. The dredging is one of the causes, among others, which has led to the increased flow of the tide?—It has.

1316. You were asked about the effect of the water at Southwark Bridge; and it

it is put to you, assuming all the matters were the same, the same quantity of water and no other would come through Southwark Bridge, but supposing the tide to be actually higher on the seaward side of Southwark Bridge, that would alter the conditions entirely?—Undoubtedly.

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1317. And that it is so is proved by what you told us in your examination in chief by the higher waters at Millwall and the other docks?—Yes.

1318. The effect would be to send a larger quantity of water, there being an increased pressure behind, through Southwark Bridge than before?—Yes, it would increase the sectional area at high water through the openings of Southwark Bridge.

1319. You said with reference to the amount which has been withdrawn altogether from the old river, in consequence of the river being embanked, that the water which would have overflowed that space would now go higher up the river?—Yes.

1320. Would not the effect, if it overflowed a particular space, be to lower the tidal way and accelerate that flow?—It has been stated that the hydraulic mean depth has been increased by the Thames Embankment, nevertheless the sectional area has been so much lessened that a smaller volume of water passes up than did under the former state of things.

1321. The amount of water that formerly went over the 50 acres does not now come up at all?—No.

1322. And, therefore, is out of the calculation either way, for coming up or going down?—Yes, it is.

1323. Mr. Ashley.] Do you happen to know whether the Thames Conservancy, above the metropolitan area, have been trying to do anything lately to compel the riparian owners to embank?—I am not aware of that.

1324. Or whether they have found any difficulty in carrying that out?—I cannot tell you.

1325. Mr. Mark Stewart.] Is there any special Act of Parliament for the Tyne, to give compulsory power to any Conservancy Board to maintain wharves upon the river?—The River Tyne Commissioners have the full control over the tidal portion of the river.

1326. And they have a special Act for that purpose?—Yes; and an amended Act was passed this Session.

1327. Sir James McGarel Hogg.] I did not gather what you said about the Tyne, and the tide coming up, and certain of the wharfingers being obliged, when their wharves are damaged, to repair them; was it the case that they had to repair them at their own expense?—They had. I was professionally employed, and can speak from experience about it.

1328. The wharfingers were obliged to repair their own wharves, which were damaged by the rising of the tide, and the greater velocity of the river?—They were.

1329. And you were employed upon it?—I was employed professionally to advise certain wharfingers upon the subject.

1330. Have the Commissioners of the Tyne power to enforce it?—They have the power to dredge the river, which caused the subsidence of the wharves by lowering the bed.

1331. And they had to repair them at their own expense?—Yes, they had to repair them at their own expense.

1332. Mr. Locke.] Do you recollect the water going over the Temple?—I think I do.

1333. Do you recollect the boats moving about in the flood?—I did not see it; I heard of it.

1334. What was the consequence when that was stopped, was a road formed from one end to the other?—Yes.

1335. What would be the consequence on the other side of the river of a similar tide; the water has gone up the river all the same, has it not?—It would involve, here and there, the raising of the wharves, to a slight extent, in some cases a few inches, and in some cases, a few feet.

1336. Has it not risen a very great number of inches on the opposite side?—In some cases it has.

1337. And is not that the case all the way through?—It is pretty general in some parts.

1338. Supposing you were going down to the City, you could go all the way to the City by the side of the river, could you not?—Yes.

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1339. That road has been carried, to a great extent, into the river there?—Yes.

1340. I ask whether or not, in consequence of that, the water which has come up the river has not gone in upon the other side to a great extent?—It has not.

1341. What has become of it?—The Thames Embankment has not tended to cause the flooding of the river on the opposite side.

1342. What becomes of the water; if it does not pass up on the right-hand side, and you say it does not go up on the left-hand side, what becomes of it?—It passes mainly on the concave side of the river.

1343. Who was it paid for the right-hand side, the whole metropolis?—Yes.

1344. Both sides?—Yes.

1345. Mr. Gordon.] As to the Tyne Commissioners, what was the state of this Act of Parliament under which the Commissioners derived that power of compelling the wharfingers to repair?—They have no power to compel the wharfingers to repair. The result of deepening the Tyne was to effect the stability of various wharves, and some of the wharfingers made claims upon the Tyne Commissioners.

1346. I understood you that the wharfingers were compelled by Act of Parliament to repair?—No, it was in self-preservation simply.

Mr. William Henry Barlow, sworn; Examined by Mr. Bazalgette.

Mr. W. H. Barlow.

1347. You are a Civil Engineer, and Vice President of the Institute of Civil Engineers?—I am.

1348. I believe for 30 years past you have had great experience in designing works, and reporting on works for the regulation of tidal and non-tidal rivers?—My practice has not been much with tidal and non-tidal rivers. In the case of the Thames, I have had a very ancient acquaintance with it. I accompanied my father upon the occasion of the experiment made for the removal of Old London Bridge, having regard to the possible effects of the removal of Old London Bridge.

1349. Does your special experience of the Thames date back to the year 1830?—Yes.

1350. I will first of all ask whether you have had experience of the Tyne, Clyde, and other rivers?—I have not.

1351. Are you acquainted with any variations which have taken place in the Tyne with regard to the effects I have mentioned?—No.

1352. What has been the effect upon the Thames of removing obstructions, and so reducing the frictional resistance to the tidal column?—Undoubtedly the effect of removing such important obstructions as those of Old London Bridge, Blackfriars Bridge, and Westminster Bridge, together with the shoals at those places, and the shoals lower down, has been to give a much greater impetus to the tidal way up the river.

1353. Has it also had the effect of accelerating the period of high water?—No doubt it has both accelerated the period of high water and increased the height to which the water would go.

1354. And that would be the effect of dealing with those causes that you have just mentioned, apart from any question of the Thames Embankment?—Apart from any question of the Thames Embankment, and also apart from the question of the land drainage of the upper lands, which would in themselves, and separately, have an influence in increasing the quantity of water in the river.

1355. That is to say, the improved drainage of the uplands, and consequently a larger volume of water sent down, had also its effect upon the question of flooding?—Yes, more especially from the circumstance that it comes quicker, not so much from the circumstance that it comes in a greater quantity, but it comes quicker, and in a given time produces a greater result.

1356. The raising of the water level would be more particularly felt, would it not, at the point where the upland water coming down comes into opposition with the tide water flowing up?—Yes, it would.

1357. At the period of high water?—Yes, at the period of high water at each place.

1358. Do

1358. Do you agree with the view previously expressed, that the effect of the construction of the main drainage system has been to abstract a larger quantity of water discharged at another point, than has been absorbed by the formation of the three embankments?—That is a simple matter of fact. I take the facts stated by Mr. Law; as a matter of fact, the area of the embankments is somewhat less than the tidal quantity of water taken away in the shape of sewage.

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1359. Has this recent increased level in the height of the tide which has taken place since the formation of the embankments been confined to that particular section of the river where the embankments exist?—No, certainly not. I accompanied Sir Joseph Bazalgette, Mr. Abernethy, and Mr. Law, upon three occasions to look at the banks of the Thames, and we noticed the effect of floods throughout the whole distance from Fulham to Woolwich, and we noticed throughout the distance various remedies were being used by parties to keep out the floods.

1360. Are you referring now to the case of the Millwall Docks; has not the increased height of the tide been felt upon the quays and Millwall Docks?—That would be more especially spoken to by Mr. Abernethy, and I am dependent upon him for the facts.

1361. And again, the Victoria Docks?—The same remark applies to that.

1362. Would the Millwall Docks be  $4\frac{1}{2}$  miles below the lowest point of the Thames Embankment?—I believe they are.

1363. The Victoria Docks would be eight miles below the lowest point?—Yes, about that.

1364. Bearing in mind those distances, could the construction of the embankment have had anything to do with the raising the level of the river at those points?—I do not see how it could possibly have any influence upon it, nor upon a part of the river lower down, where the evidence of floods is very decided.

1365. Then those facts, I take it, rather go to show that the increase of level in the height of the river, which has taken place since the formation of the embankment, has been generally not confined to any particular section?—Certainly; it is very much due to the continued scouring that has been going on in the river, both naturally and arising from the removal of the obstruction of the bridges, and also a great deal has been done artificially, of course by persons such as the Thames Conservators, and others, who have been deepening the river.

1366. What, in your opinion, has been the effect of constructing the embankment vertical walls upon the up-flowing tide, and also the ebbing tide?—The construction of those embankments, more especially the Victoria Embankment, seems to have had two effects, one being a little opposite to the other; in the one case, an even column, and a wall of a given height, would tend to increase, and does increase, the velocity of the water past that point; on the other hand, the sectional area has been diminished; and I observed, by experiments that have been made, that if you take the actual velocity and actual space, it appears to deliver a somewhat smaller quantity up than it did before; I should say the effects about balanced themselves.

1367. It has been suggested that the effect of constructing the Thames Embankment has been to confine the volume of water which formerly existed in a narrower channel, and therefore to raise the level of the river; is that so?—Certainly not; the idea upon which that remark is based must be this. I think it might be that a certain space is taken up by the bank, and a certain quantity of water is coming through to the bank, and therefore it must increase the level of the water above it to that amount, but that is not so, because so soon as any increase of level begins above the embankment it has the effect of impeding more water from coming up; and although there might be possibly a very slight increase arising from it in that sense, I do not believe practically there is. There is another point to be considered, that the space of the Thames Embankment, small as it is in comparison with the river, still is a space to be filled up; if that space was a vacant space, and the tide is coming up, all that time the space is being filled the current of the water below is increased more than it would be if the space is already filled. I am not sure that I make myself understood upon this point. That being the case, a greater impetus is given to the water below the embankment, and therefore a greater quantity

**Mr. W. H. Barlow.** would probably come up, and it would come up until the impetus is exhausted.

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1369. Is not the amount of tidal water sent up into the channel or basin something like equivalent to the capacity of that basin to contain it?—I do not follow that question.

1370. Supposing you have a large basin to fill, the water which came to fill it would require a greater head to fill the basin than if you were to reduce it, and so reduce the head?—I understand if you have a large basin to be filled, and the tide is coming through a given space, it would certainly bring more water through that space than it would do if that basin was not there.

1371. As you reduce the size of the basin which has to be filled, so you reduce the head?—Yes.

1372. As you reduce the head, so you increase the velocity?—Yes, before arriving at the basin.

1373. And as you decrease the velocity, so you diminish the quantity of water which comes up?—Yes, you do.

1374. Is not that the operation which has taken place with regard to the Thames Embankment?—I think it is; it cannot be otherwise.

1375. So that in effect the construction of the embankment has excluded, not displaced, a quantity of tidal water from that particular section of the river which formerly found its way and flowed there?—It has had the effect of decreasing the quantity of tidal water flowing upwards past the bridges before arriving at the Thames Embankment.

1376. I will ask you to assume that the Thames Embankment was never formed, and that during the recent high tides which have taken place the river was in its original state, previous to the formation of the embankment, what would have been the effect of it upon that, particularly with regard to flooding. I ask you to assume that the embankment has never been made, and take the floods in November 1876, and assume the old state of things to exist in November 1876, what would have been the effect with regard to the floods?—I do not believe, practically, it would have made any difference whatever; probably the theory, if worked out, would show that the floods would be somewhat greater if the banks were not there than if they were, but practically it makes no difference.

1377. Theoretically I understand you to say that if there is a balance either way, it is rather in favour of the embankments?—I think so; but I think the point is so very small a one that I do not care to go very minutely into it.

1378. Would one of the reasons why the theoretical water should have risen higher under the old state of things be, that the frictional surface was much greater upon the site of the river now occupied by the embankment?—The frictional resistance was, no doubt, greater in a certain ratio before that embankment was made than it now is; but, as I said before, the sectional area has been diminished, and the two effects, probably, very closely balance each other.

1379. You have stated the causes which, in your opinion, have contributed to produce flooding in the metropolis; do you consider that those causes have come to an end, or do you think that as improvements in drainage, and so on, are carried on in the upland districts, the severity of floods must increase?—I have not the slightest doubt that they will increase, in all probability, if further improvements are carried on in the removal of shoals in shallow places down the river, and further improvements will be carried on in the agricultural drainage, and if those improvements are still carried on, these effects will naturally increase.

1380. Did you make an inspection of the river?—I was three days up and down the river, to have a look at the general effect of it.

1381. With reference to property proposed to be dealt with by this Bill?—Yes, not a minute inspection, but I saw the banks along the river.

1382. Did you take an opportunity then of seeing what had been done, with a view to prevent floods in the future?—Yes, I saw that a great deal of work had been done, small of its kind, but considerable in point of length; there were banks along the Thames, places where walls have been raised, places where wharves have been raised by wood, and there were places where doorways had been raised.

1383. Was



1383. Was that work of a costly or expensive description?—No, I did not make an estimate of it; I formed an opinion in my own mind that something like a pound a yard forward would pay for it.

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1384. Was it effective in your opinion for the purposes for which it was intended?—I have no doubt it was; I did not visit it in a state of flood to see if there was any leakage, but I have no doubt from what I saw that everything would be sufficient for the purpose.

Cross-examined by Mr. *Parker*.

1385. Where did you see these contrivances?—At various parts of the river, all the way from Fulham down to Charlton.

1386. I daresay you saw what the Limehouse Board have had done in their district?—I do not know that I am prepared to say minutely what it was.

1387. I daresay you know, as you have been down that part of the river to make an inspection, that the Limehouse Board have carried out such works as you describe in their district?—I believe I saw some in the neighbourhood of Limehouse.

1388. I believe there is one part, and only one, in the district of Limehouse, where they have not positively prevented any chance of flooding?—I am not able to speak to that.

1389. Supposing there were one such place which has been described as a landing stairs passing under a house, and at a low level, and they had temporary means of shutting out the water in case of flood, it would be all that you think requisite for such a place?—Your question rather goes to this, that there is something to do, and if that was done it would be all that is necessary.

1390. There is no difficulty, in a case of that kind, in having a temporary means at hand which can be adopted?—I should not like to speak to a particular place without knowing what it was, but none of the cases that I saw were at all difficult.

1391. Are you aware this Bill does not deal with engineering matters at all?—It calls upon certain persons to do engineering matters.

1392. To do what is requisite?—Yes.

1393. It is a Bill to provide the requisite direction for doing what may be necessary, without explaining what is necessary?—You must excuse me from going into the Bill. I do not know how to read Bills.

1394. I want to get at the relevancy to be attributed to this mass of engineering evidence which has been thrown at our heads; what has it to do with the Bill?—I cannot give any answer to that.

Cross-examined by Mr. *Richards*.

1395. You alluded to the dredging of the river by the Conservators?—I did.

1396. With regard to what you said about the sectional area being increased by the dredging, did I understand you rightly to say that the volume of water that is borne by the tide up the river now is less than it was formerly?—Which part of the river do you allude to?

1397. The river in the metropolitan district?—It varies very much in the metropolitan district. I have no hesitation in saying that the quantity of water passing between Greenwich and Woolwich is much greater than it formerly was.

1398. But what is the case in the higher reaches?—I cannot answer the question.

1399. Under existing circumstances, in reference to the embankment, a larger quantity of water is kept now in the upper part of the river than there was formerly?—No, I do not say so at all; the question put to me was a supposition of a certain tide in the river, what its effect would be; but the tides which come up the river are very much greater than they were, and there is more water from that cause. The question put to me was an abstract question, as to what would take place at a particular time; but the tides themselves are greater, and that necessarily brings a greater quantity of water.

1400. But you do not attribute the fact of the tides being greater to the dredging of the river, do you?—Yes, I do, as one of the causes.

1401. But do not you consider that that effect is more than compensated for

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by other causes?—No, I do not; I think the dredging which has taken place in the lower part of the river, and which has been carried to a very large extent, has a material influence; it imparts a velocity to the tidal wave, which does not expend itself till it gets considerably higher up the river.

1402. Generally I understand you to say that the volume of water now going up the embankment is less than it was formerly?—No; I spoke of the effect upon a particular fixed set of circumstances, as to whether a bank was there or not there; then we have a different set of circumstances, inasmuch as we have very much higher tides than we had before; the tides are higher by an amount of 4 feet 6 and 4 feet 9 inches.

1403. But you consider that the effect of the embankment has not been generally to increase the volume?—Certainly not.

Cross-examined by Mr. Clark.

1404. Do I understand you to say that the height of the water above the line of London Bridge has not been greater within the last few years than it was before?—No, I do not say so.

1405. You are aware, are you not, that there have been within the last four years floods higher than at any time for a good many years before that period?—Yes.

1406. To what do you attribute that?—I attribute that to the causes I have just now stated, the removal of obstructions in the lower part of the river, and the improvement in land drainage in the upper part of the river.

1407. Taking them separately, what is the chief cause under the first head, the removal of obstructions?—I do not know which to name first, but the more prominent ones were the removal of London Bridge, Blackfriars Bridge, and Westminster Bridge, the shoals shown in pink upon that map; and the very large amount of dredging done in the lower part of the river.

1408. As to the bridges, by far the most important of the causes was the removal of London Bridge, was it not?—It was one of the most prominent.

1409. Was it not by far the most important in its results?—As a single individual work, perhaps it was.

1410. Dealing with it in that way, it was so?—Yes, but I do not know whether it would be more important than the bridges, if you take into account following upon that case the amount of dredging shown on the map.

1411. But London Bridge was removed a great many years ago?—About 1834 I think.

1412. The full effect of the removal of London Bridge had been felt 40 years ago?—No, I do not think so; because the removal of an obstruction of that sort, creating a more rapid current, would begin to scour, and the effect of the removal of London Bridge might not be fully felt for many years afterwards.

1413. I understand that the removal of London Bridge might set causes at work which would, in the course of time, produce stronger results?—Yes.

1414. As far as London Bridge was concerned itself, and the obstruction that it offered to the stream, that effect was felt 40 years ago?—Yes.

1415. Where do you say the scour and the deepening has taken place?—In the first place, in the immediate neighbourhood of the bridge, but a great deal much lower down the river.

1416. That is an improvement of the river?—Yes.

1417. And that improvement has taken place through the increased velocity of the stream?—Probably it may be attributable to that to a certain extent; it is very difficult to particularise the actions.

1418. And when you narrow the banks of the river, I take it that you add velocity to the current, and so improve the stream?—I am not prepared to say that; it depends upon circumstances whether narrowing the banks of a river will add to the velocity of a current.

1419. Assuming the velocity of the river to have been increased by getting rid of shoals, it would improve the navigation of the river?—Yes.

1420. Would not that be the natural result of embanking both sides of the river?—Not necessarily.

1421. Supposing there were opportunities in the case of a high tide of the water escaping and flooding the adjacent lands, and you prevented it by stopping up

up the opening, and making it run through two sound banks, would not it increase the velocity?—No; the velocity on approaching the space would be greater if the space was there than it would be if you filled the space up.

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1422. Assuming the velocity of the stream to be increased, to what do you attribute it?—Where?

1423. Say at Westminster Bridge or the Victoria or Albert Embankments?—Say the Victoria Embankment. I attribute the increase of velocity to the diminution of distance; there is a greater mean hydraulic depth in the water, and there would be a corresponding head inducing a greater velocity.

1424. The resistance of the incoming water would have to be met at some point or another?—Yes.

1425. Whenever that resistance is met, would not the natural result be to raise the level both of the up-coming and down-coming waters?—It would, if the quantity was greater.

1426. If the quantity going up was greater; but, as a matter of fact, it appears at the Thames Embankment the quantity of water going up in a given time is not greater; whatever the quantity of up-coming water may be, somewhere or other the resistance of that up-coming water must be overcome?—Yes.

1417. And supposing the down-coming stream be increased in volume, it would overcome that resistance by raising the water of the up-coming stream?—Your question is rather a longer one than I can take in at once.

1428. Somewhere or other you say the resistance must be overcome of the up-coming water; assuming the volume of water coming down the stream to be constantly increasing, would it not overcome the resistance by raising the level of the water throughout?—Yes.

1429. Is that the cause of the increased height of the tide?—By the increase of the down-coming water, do you mean the increase of water from land drainage?

1430. Yes?—Yes, certainly, and one of the causes of the floods especially, as distinguished from high tides, is undoubtedly the down-coming water from the drainage.

1431. Assuming that the resistance of the up-coming water has to be overcome between narrow and fixed banks, would not the effect naturally be to raise the level there?—Before arriving at the banks, it would.

1432. Above or below?—Before arriving at it, if the water that is coming down the river meets a narrow passage, it would have a tendency to raise it up, just what it met with in its passage.

1433. And in the narrow passage too?—I do not know; only at one end of it, not the other. Supposing you have a narrow channel, and the waters are flowing down from the uplands, and there is space for them to flow below the narrow channel, they would be banked up at the upper end of it and depressed at the lower end of it.

1434. Do I understand you to suggest that between the narrow channels the water would be affected in this way, that there would be a hill at one end, and then a level?—Not a hill.

1435. Would not it be distributed over the whole of the stream?—No.

1436. You say floods will, in your judgment, increase?—If the same causes continue to operate that have operated heretofore.

1437. And, so far as you are able to judge, those causes will continue to operate?—Yes.

1438. In your judgment, is it sufficient to do enough now to deal with the evil at present existing?—It is a slow process; if you deal with the evil as it is, then you can in time meet other evils should they arise.

1439. Then you must contemplate a series of operations?—Very likely, at great intervals of time.

1440. Is that what you do contemplate with respect to the powers of this Bill?—I am not speaking of the powers of the Bill, but I have no doubt whatever that in process of time you will have a further rise of high water.

1441. Then the work which is necessary to be done at the present moment for dealing with the state of things which exists this year, might not be necessary some years hence?—Certainly they will be necessary.

1442. They might not be sufficient?—Taking a long interval of time probably we may require something more.

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1443. And supposing the thing to be done upon any comprehensive plan, it would be desirable to deal with the future as well as the present?—Yes.

1444. Is that contemplated by the Bill?—I do not read Bills, as I said before, but I believe it is; there is a continuance power of action in the Bill.

*Cross-examined by Mr. Pembroke Stephens.*

1445. What did you exactly state, in your opinion, to have been the effect of the diversion of the water from the upper part of the river through the sewers?—To diminish the quantity of water in the river throughout the part diverted.

1446. Then that would be a direct result of the operations of the Metropolitan Board of Works?—Yes.

1447. Done by general taxation?—Yes.

1448. Where you have a less quantity of fresh water coming down the river, is the effect of it in engineering phrase to advance the salt-water line?—I suppose it will be.

1449. Then the bed of the river remaining the same, if you have less fresh water coming down the river, the vacant space would be filled by more salt water from the sea?—I do not know that the vacant space would be wholly filled by it. I suppose it may be right to say that the salt water would be advanced a little up the river.

1450. That would be the result of the operations of the Metropolitan Board of Works?—Assuming that they took out that quantity of water, and it was not supplied again from any other place, that might be the result.

1451. Assuming your opinion to be correct, and that the fresh water has been diminished by being diverted through the sewers, it follows necessarily that the salt-water line must have been advanced?—There is this in it, the water which has been diverted by the sewerage is not taken down to the sea, but is taken down to the point in the river rather in advance of where the salt water comes.

1452. If you go off into side issues, I must point this out; that is pent up for some hours and only discharged at certain states of the tide?—It is discharged so soon as the tide begins to fall.

1453. I talk not of the tide beginning to fall, but of the advancing salt-water line coming up the river, which is the time when the salt water would be pent up?—Taking into account the manner in which it is discharged, I do not see how it is going to cause the salt water to come higher up the river.

1454. You put the question of discharge upon me, and the question of drains; if you withdraw the fresh water from the river and take it into a reservoir or elsewhere, is not the effect to advance the salt water line?—I must say in regard to that, if you take it out of the river at a point, say at Fulham, and put it in at a point at Woolwich, it makes no difference whatever to the advance of the salt water, but if you took it out of this part of the river, and put it down below where the salt water comes in, it would.

1455. What happens with regard to the vacant space between where you take it out and where you put it in again?—The vacant space would have so much less water, with this remark, that there would be more flowing in from the two sides to make the balance.

1456. Perhaps you will kindly answer my question; is it not the fact that the salt water has now, since the making of the drainage works, reached a higher point than it did before?—I cannot speak to that as a matter of fact, but I believe it has.

1457. Is not the point where the floods occur the point at which the one water meets the other and, so to speak, rides over it?—That is a very difficult thing to comprehend; there is no special point; the fact is this, floods extend over miles and miles, and it makes it difficult to comprehend the point at which the floods occur.

1458. We have heard a great deal from the witnesses about the resistance of one water to the other; that is the point where the two waters meet?—Yes.

1459. That being so, I ask whether the point of the aggravation of the floods is not where one of these waters meets the other and rides over it?—You may put it so, but that point travels or moves from one point of the river to the other.

1460. We know that training walls accelerate the flow of a stream?—They do.

1461. Will not the works proposed by this Bill be in effect, though not in name,

narrow, training walls?—No, I think not. I think they cannot be regarded in that light. The walls to which you refer are walls going directly down into the water; the small matters to be done in this Bill are things varying from 1 foot to 2 feet in height.

1462. Still they must be, to be of any use, continuous walls, hemming in and restraining the tide?—They are not continuous in that sense; they may go in and out and have all manner of irregular openings; they are continuous but not equal in form.

1463. Continuous laterally, following the direction of the stream?—No, certainly not always following the direction of the stream, very often at right angles to it; they follow the sinuosities of the river.

1464. You do not propose by this Bill to make walls at right angles; what you want are walls to front the stream?—Supposing the water runs into a little draw-dock, you would follow in some cases the wall down the draw-dock; so far, it would be at right angles.

1465. And having got your corner in, you will come out again, and when you come out again there will be the training wall?—If you like to call it so.

1466. My learned friend has pressed you very strongly about the embankment not reducing the available space for the water, and he asked you, and you adopted his view, that as you reduced the basin you reduce the amount of water that comes into the basin?—No, I did not say so.

1467. What is your view upon that point?—What I said was, if the water was running through a general channel into a large basin, more water would necessarily come through that channel than if the basin was filled up to the width of the channel.

1468. If you fill up the basin, and the basin ends there, you cannot get more into the basin than the full of it, I admit; but what I want to know is whether if you took a slice off the side of the river, like the red patch up there, you diminish the quantity of water coming in from the sea?—I think you do; and you certainly would do, because otherwise if the space is to be filled by water coming in from the sea, the level of the water on the western side of Waterloo Bridge would be lower than it would be if the bank was filled up, and if the level of the water is lower, the velocity of the water approaching it will be greater.

1469. That is level and velocity; I talk of quantity; if you take a slice off the side of the river, do you in any way diminish the quantity of water coming up the river?—I think you would.

1470. And your view is that the water would accommodate itself to the reduced space?—Yes.

1471. There is a wall down under this window?—Yes.

1472. There is a certain amount of water going between that and the wall at the other side of the river?—Yes.

1473. According to your theory, if you could push the wall on this side of the river to within a foot of the wall of the hospital at the other side of the way, the water coming up from the sea would accommodate itself to that space?—It would find a level of some sort.

1474. Is that your opinion?—I have great difficulty in following out the precise idea in your mind, in answering the question; you propose that the wall of the embankment in front of the House of Commons should be carried to within a foot of the wall opposite?

1475. Yes?—Then what is the question after that?

1476. I want to know whether, taking your previous answer, the water would accommodate itself to the reduced channel through which it would have to flow?—I suppose it would accommodate itself; it could not help itself. I do not understand what you mean by accommodate itself.

1477. The amount of water coming up would not be greater than the space which was left for it to fill?—If you were to narrow the River Thames at this place to one foot, you would undoubtedly impede the tidal action in approaching a narrowed space.

1478. But would you only have a foot of water coming up?—I really cannot say, but you would impede the velocity of the water in approaching that place.

1479. That may very well be, but I am only applying your principle to the

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fact of pushing the wall in front of the House to within a foot of the wall on the other side of the river?—Yes, my principle is perfectly right, if you go to that length.

1480. Am I to understand, supposing we carry over this wall to within a foot of the other side, you will only have a foot of water coming from the sea to fill that vacant space?—You would stop the action from the sea by imposing a very large amount of friction there, which is not existing at the present time.

1481. Now I will ask you this: just follow the evidence in this case; you have been listening to it, have you not?—Yes.

1482. Suppose Mr. Henry Law's south-west gale, followed by a north-west gale, with the crest of the blue wave superpoised upon the red, all coming up the river together, do you undertake to say, under these circumstances, that the mere fact of having advanced this embankment to within a foot of the other side of the river, would prevent more than a foot of water coming up?—Where is it to come? It will come up to the entrance of the narrow channel you interpose, and then when it comes to the narrow channel it will create such an obstruction that there will be a total change of circumstances on the other side of it.

1483. What would be the result, in your opinion?—The result would be a less height of flood on this side of it.

1484. Do you still say that the quantity of water going up, notwithstanding the advance of the salt-water line, would only be one foot?—I really cannot understand how you put your question.

1485. We will still suppose that some narrowed space, and we will add on to the north-west storm and the south-west gale, heavy rain in the upland districts; now I want to know whether the water coming down would accommodate itself to your one foot of space?—I do not know what you mean by the water accommodating itself.

1486. I take your own phrase?—The effect of the water coming down would be impeded at this very place, and the effect of the water coming up would be impeded at that very place.

1487. And impeded to such an extent that it would not be able to go through it?—The water going down would be impeded; the floods would be on the other side, the same.

1488. On the higher side?—On the higher side.

1489. Now I want to ask you whether the result of that evidence is not that the narrowing of the channel leads to floods?—No; it has been stated over and over again that in this case, although the channel is narrowed, it is deepened, and the quantity of water passing through is much the same as it was; if anything, a little less.

1490. That is the sort of song that all the witnesses have sung; but I want you to answer my question, whether the narrowing of the river has any effect whatever upon the water coming down?—Do you mean whether any narrowing of the river would, or this particular narrowing?

1491. Whether the narrowing of the river at any point affects in any way the quantity of water coming down?—It impedes it coming down.

1492. And suppose you bring it into a narrow channel, must not the immediate result of it be floods?—If your channel is not deeper, necessarily it would be; but supposing you bring it into a channel which is narrower, and at the same time deeper, it is capable of taking as much water as before.

1493. Probably you heard one of the previous witnesses give the width at Wandsworth and Nine Elms, the narrow parts of the river?—Yes.

1494. Is it not a curious circumstance that floods should take place in and about those narrow points of the river, and that the narrowing of the river by the Thames Embankment has no effect whatever?—They do not take place any more about the narrowed places than at other places.

1495. Is that your view and belief that they do not take place more about those places than others?—I speak of what I saw in looking at the Thames the other day, that there were works carried on down near Woolwich quite as prominent as the works carried on in the neighbourhood of Fulham. There is a great difference in the width.

1496. As a matter of fact, are not the floods which we heard of, and of which

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so much talk is made about, floods occurring at Wandsworth, Nine Elms, and those districts which happen to be in narrow parts of the river?—There are floods, no doubt, at those places, which are the narrow parts of the river, but there are floods at places which are broader.

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Re-examined by Mr. Cripps.

1497. Just a word upon this waste of time about the narrowed parts of the river; if you narrowed the river to a foot you would produce a flood, because you produce obstruction?—Yes, as regards the upland water.

1498. And you would be narrowing the channel to a much greater narrowness than existed at Southwark or London Bridge?—Yes.

1499. But supposing the river were already narrowed at London Bridge and Southwark Bridge, in that case the sectional area might be narrowed to a considerable extent without having any effect at all?—Yes.

1500. It is the narrowest point of the river which regulates the flow to a great extent?—The narrowest point of its area.

1501. And that narrowest point is not here nor opposite the embankment?—It is not.

1502. Therefore until you have narrowed that to the narrowness below, it would have no effect?—It would not.

1503. Now as to the basin which overflows; if the water when it comes through this narrow part finds a place that it has to fill up, and there is an overflow, it will cause the stream to come up with greater velocity than before?—Yes, it will.

1504. And when you take away that open space, which increased the velocity before, you do not increase the velocity by taking away the space?—No, on the contrary, at that part of the river approaching the space you diminish the velocity by filling up the space.

1505. Because the stream when it comes through has so much space to expend itself upon, and so lowers the tidal wave?—That is so.

1506. Now a word about the water as it comes down; a certain quantity of water has been taken away from the Thames at Teddington for sewerage purposes?—Yes.

1507. But that is restored to the river again before the tidal flow comes up?—It is.

1508. And therefore the same body of water coming down is there to check the tidal flow that there was before?—Yes, it is only out of this portion of the river between the points at which it is taken out, and the point at which it is put in afterwards.

1509. It is taken out of the channel temporarily; there is a greater space in the river opposite here, but as far as the tide goes, it goes into the river again before the tide operates upon it?—Yes, it would tend rather to impede the inflow of the tidal wave.

1510. One of my learned friends laid a great deal of stress upon the greater quantity of the upland water coming down in increasing the head of the river; if that is so, no one in the metropolis is at all responsible for it?—No.

1511. If that is a source of raising the head of the tidal wave at all, it is a source depending upon something done upon the upland part of the river, quite independent of the metropolis?—Yes.

1512. And it is possible, looking at the future, that that may be greater than it has been hitherto, by the increased drainage, and by the stream flowing down quicker?—It is reasonable to assume that such will be the case.

1513. You were asked about the possibility of a series of operations in the river; it may be that what is done to-day may not be sufficient for some increased flow of the river, or some flood which may occur at some future time?—No.

1514. Then there would be a necessity, would there not, not only to have somebody who could order the repairs to be done to-day, but some authority to continue to superintend the measure, and do repairs from time to time, as the

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increased



Mr. *W. H. Barlow*. increased flood rendered the increased work necessary?—Yes, it shows the necessity of having some such authority.

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1515. It is perfectly true that you cannot foresee what may happen in a tidal river, and what is done may ultimately not be sufficient for some change of circumstances?—Yes, it is necessary to have the means of dealing with this case of floods, not only now, but as they may be 10 years hence.

1516. Within a district like London, where the overflow water would do so much damage, it would be an essential thing to look after and take care of?—It is a plain matter of observation and sense that it must be so.

1517. You were asked whether the recent tides had not been so very much higher than former tides; I do not know whether you are aware that the tide of 1875, that we have heard specially from Mr. Law, was six inches higher than any tide known?—The 1875 tide was higher. I do not know that it was six inches higher.

1518. Excepting that tide, do you know that there have been, according to records, as high tides in times long before the embankment was made, or anything done in the river?—At the time that I gave that answer it did pass through my mind immediately afterwards, that I had heard a statement made by Sir Joseph Bazalgette the other day, that there were higher tides in the earlier days; but we hear of more frequent high tides now.

1519. Undoubtedly we do hear more of the matter than we did before?—Yes.

1520. Assuming that the tidal wave comes as it did before, is anything else necessary to account for the flooding, excepting the fact that the bank of the Thames is so low at certain parts, and therefore the high tidal wave goes over it?—That is a plain matter of fact.

1521. What is abstracted from the tidal wave as it comes up a river like the Thames, by the overflow at times, is infinitesimally small, as compared with the up-flow of the tide, is it not?—It is.

1522. But although infinitesimally small, as compared with the body of the tide, quite sufficient to do an immense amount of damage?—Yes, in a crowded locality like London it is a very serious evil indeed.

Mr. *G. E. Lusk*. Mr. George Edward Lusk was called in, and Examined by Mr. Cripps upon the posting of the Circular of the 17th April 1874. See Minutes of Proceedings.

Mr. William Henry Barlow, recalled.

Mr. *W. H. Barlow*. 1523. *Chairman.*] Sir George Elliot particularly wishes you to answer this question. You observe that on the 18th November 1840, there was an extremely high tide; then a number of years pass and we arrive at the year 1874, with no very exceptional tide occurring, but in the years 1874, 1875, 1876, and 1877, we find extraordinary high tides, all of them higher than in 1840; how do you account for that?—I believe these high tides have occurred from exceptional circumstances, with regard to wind and rain; inasmuch, however, as I did not prepare this document, but it was prepared by Mr. Law, I am sure if you call him before you, he will be able to give you information that will answer the question.

Mr. Henry Law, recalled.

Mr. *H. Law*. 1524. *Chairman.*] Sir George Elliot wishes this question answered: In 1840 there was a high tide, and then a great number of years passed, down to 1874, with nothing very exceptionally high; then in 1874, 1875, 1876, and twice in 1877, we have extraordinary tides, which are higher than the tide of 1840 already referred to; what has been the cause of this, is it from some great climatic change?—The cause has been the deepening of the river above London Bridge, and at Westminster and Blackfriars Bridges, consequent upon the removal of those bridges.

bridges. The immediate effect of the removal of those bridges was to lower the low-water line; that left an insufficient amount of water for convenient navigation. The Conservators have, during the last few years, carried on most extensive dredging operations, removing shoals, dry at low water, and the removal of shoals has still further lowered the low-water line, and given great facilities for the tidal wave to run up; and that has really been the effect; it has been gradually progressive, but it was very marked after the removal of Westminster and Blackfriars Bridges, which were the last impediments to the action.

1525. When were they removed?—Blackfriars Bridge was removed about that period.

1526. Surely the most important of all the agencies in making the change was the removal of London Bridge?—It was, but it left the shoals shown by the shaded portions on Drawing No. 3, and until they were removed, the strong effect was not felt.

1527. In the last few years, since the Thames Embankment was made, these floods which have been so high have been more often repeated?—It is also since the removal of Blackfriars and Westminster Bridges; that was contemporaneous with the Victoria Embankment; they were the great cause; it was the removal of Westminster and Blackfriars Bridges which produced the change, and not the formation of the embankment.

1528. When was Westminster Bridge removed?—Westminster Bridge was removed about 15 years ago. Drawing No. 7 shows that these floods have happened before at spring tides when the predicted tide was high. The tide of the 20th of March 1874 was an extraordinarily high tide, but its height above the predicted height was very small, only 2 feet 6; it was caused by the accidental coincidence of many circumstances, as illustrated in the various drawings which I have laid before you.

1529. Sir George Elliot.] There are five instances in two and a half years where the water was higher than anything we had had before?—These four tides occurred in four successive years, 1874, 1875, 1876, and 1877. The four high tides in January 1877 are a continuance or the dying-out of the same effect.

1530. Sir Andrew Lusk.] It is said that the narrowing of the channel causes the floods. Supposing you put a barrier at London Bridge, and stop the river altogether, would the tide rise any higher?—The tide would not rise any higher upon that account.

1531. Mr. Gordon.] Can you give the Committee the exact date of the removal of Westminster and Blackfriars Bridges?—Yes, I can give it on the next sitting of the Committee.

Sir Joseph Bazalgette, re-called.

1532. Chairman.] How soon can you get the plans and estimates ready?—They would extend over 42 miles of frontage of the River Thames. The greater part of that is occupied by buildings, which are shown upon the sections which I produced here in detail. My assistants are at this moment engaged upon those plans, as many as I can put upon them, working late at night to endeavour to get the estimates ready early next week. Until they have completed them, it would be impossible to commence the copies of the plans. If copies of the plans have to be made it would not be possible to do it in less than a fortnight after this time. This is not like an ordinary engineering work which is a straightforward thing, but it involves an immense mass of detail. Those plans, to be of any service, must not only be copied but coloured to show where new works done and where new works are required to be done. If counsel will be satisfied to have any particular parts upon which they wish information, I could lay copies of them before them. I could get them done in a reasonable time, but it is simply impossible to make copies. I produced one or two sections; there is a great deal of detail in them, and I did not produce to you anything like the number of sections that would be necessary to show the whole thing.

1533. Chairman.] It is distinctly understood that a week before the 7th of June, you will produce to the counsel the same plans and the same estimates

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that you are going to bring before us?—I can only have one set of tracings made.

1534. How soon can you do that?—I can produce one set of copies, which the opponents can see anywhere they please.

1535. Can you give each the section that relates to his own district or parish?—Yes, if that will be enough.

1536. Sir *James M'Garel-Hogg*.] Every person who appears in this room, if they come and ask for the district which they represent, can have a section of that portion?—Yes.

*Mr. Williams*.] The week before the meeting of the Committee.

*Mr. Littler*.] Will you divide it into districts, and let each of us know what the total cost of the whole work will be?

*Witness*.] It will involve a great deal of additional work, dividing them into districts.

*Mr. Littler*.] Give us the total of each district, with the particulars relating to each particular district.

*Witness*.] That subdivision into districts will involve a great deal of additional work. I have classified it not as to districts, but according to each particular work. I am getting it into a tabulated form, which I shall have to alter again.

*Chairman*.] The important part of the case is the incidence of taxation.

*Thursday, 7th June 1877.*

MEMBERS PRESENT:

Mr. Ashley.  
Sir George Elliot.  
Mr. Gordon.  
Mr. Grant Duff.  
Sir James M'Garel-Hogg.

Mr. Locke.  
Sir Andrew Lusk.  
Mr. Mark Stewart.  
Mr. Watney.  
Mr. Wilson.

MOUNTSTUART E. GRANT DUFF, Esq., IN THE CHAIR.

Mr. *Henry Law*, re-called; and further Examined by Mr. *Bazalgette*.

1537. I SEE you were asked at Question 1531, by one of the honourable Members of the Committee, "Can you give the Committee the exact date of the removal of Westminster and Blackfriars Bridges?" and you say, "Yes, I can give it on the next sitting of the Committee." I believe you are now prepared to give that information?—I am. I find that Westminster Bridge was partially opened on the 1st of March 1860, but that the old bridge was necessarily kept for the foot passengers until the entire completion of the new; and that, therefore, there was a greater obstruction offered at the date of the completion of Westminster Bridge than there had been before it was built; because not only did the old piers remain, the greater part of them, but the piers of the new bridge also existed. It was not until the end of 1861 that Old Westminster Bridge was entirely removed.

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1538. So that, in fact, the piers of the old bridge were not finally removed until more than two years after the first opening of the new bridge?—Yes. I find that Blackfriars was commenced before the end of 1865, and the old bridge was entirely removed towards the end of 1867.

1539-40. Previous to the removal of the two bridges, were there large shoals existing in the neighbourhood of the bridges?—They existed previously, and existed for some time after.

Sir *Joseph Bazalgette*, re-called; and further Examined by Mr. *Cripps*.

1541-2. You, of course, remember what took place, which I have just now been reminding you of, as well as the Committee, upon the last occasion when We were here?—Yes.

Sir *J. Bazalgette*.

1543. And it was arranged that you should do your best to prepare plans showing what you considered necessary for the purpose of prevention of floods all along the metropolitan area?—Yes.

1544. Will you be kind enough to tell us what you have done in pursuance of what you understood to be the desire of the Committee?—I have sent to the different parties interested sections showing the properties all along the banks of the river, each property being numbered, and a schedule accompanying those sections with a corresponding number, showing the length and the character of the work proposed to be executed, and an estimate of the cost of the works in each parish or district.

1545. I think that the best and most convenient course will be for you to go through the separate plans, taking each part which you have separated off by itself, and just tell the Committee what they are?—I had perhaps better give you a summary; the details would occupy the whole day to go through. Taking

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the north side of the Thames, the work required is, raising the walls; taking the Fulham district, it would cost 5,100 *l.*; in addition to which some of their existing walls are very much out of repair, and require to be repaired at a cost of 1,200 *l.* Similar works in Chelsea parish would be 253 *l.*; in St. George's, Hanover-square, 1,461 *l.*; Westminster, 478 *l.*; in the City, 700 *l.*; in the Whitechapel district, 250 *l.*; in the Limehouse district, 2,039 *l.*; in the Poplar district, 6,700 *l.*; in North Woolwich, 28 *l.*; making, for the whole of the north side, 18,200 *l.* On the south side of the Thames, the Wandsworth District Board would have to expend 9,700 *l.*; Lambeth parish, 2,800 *l.*; St. Saviour's district, 1,800 *l.*; St. Olave's district, 200 *l.*; Bermondsey parish, 400 *l.*; Rotherhithe parish, 2,800 *l.*; Greenwich district, 10,500 *l.*; Woolwich parish, 2,200 *l.*; Plumstead district, 1,400 *l.*; in all, on the south side, 31,800 *l.*; which, added to the 18,200 *l.* on the north side, makes the total cost 50,000 *l.* That is the estimate. Now as regards the works, they are given in the form of a schedule. I will just illustrate that by taking up the Wandsworth district; there is a number in the Section 611. Each parish has had in detail the works to be done at each of the premises, and then a summary of those works. Taking Wandsworth, it shows 210 feet of earth bank, raised four feet high; 130 feet of earth bank, raised three feet high; 200 feet of earth bank, raised two feet high; 100 feet of walling raised five feet high; and so on, from one to five feet. Then tide boards for openings, the number is given and the height of them. Then come special works that are described, raising the flood gates at the Beverley Brook tidal flap and head-wall near the same gates, and raising the walls at the drawdock gates at the approach to aqueducts; ditto at York-place, Battersea; ditto at the drawdocks, and so on. Those are given in greater detail, and there is a number to each of the premises. We will take a few of those. No. 609 is the Wandsworth Gasworks, which require 200 feet run of wall, raised one foot high. Each district has received details of each of the works of the particular district in the manner I am now describing. No. 610 is a passage, nothing requiring to be done there, but a gate to be placed at the top. No. 611 requires a wall five feet high, for a length of 320 feet. No. 700 requires a wall 10 feet high.

Cross-examined by Mr. Littler.

1546. I gather from my learned friend, Mr. Cripps, that you are wholly unable to say what might have to be added to this for compensation?—Quite unable.

1547. For anything you know, it might be fifty times the amount?—I can form no opinion of that, and I have no data from which to do so.

1548. So far as to the amount or the question of what taxation we shall have to bear under your Bill goes, we are no nearer than we were, except so far as the actual works are concerned?—I can only speak to the works.

1549. Had you formed anything like a notion of the amount requisite for the works before the Bill was deposited?—I had not made any estimate. I had formed an idea, but I had made no estimate.

1550. Am I right in saying that either you or some one suggested to the Board that it would be a quarter of a million?—I have made two or three reports upon this, and have assumed the different states of things, and I have given figures for those different assumptions, but I have never, as I have done now, gone into the actual work at each of the premises and made an estimate.

1551. And there is nothing whatever in this Bill to bind you to anything like this amount; if this Bill is passed, you can order any works you think fit?—I apprehend that it would be so.

1552. It may go back to 250,000 *l.* or to 2,500,000 *l.* for any control that anybody will have over it; I do not say what is likely?—The Metropolitan Board's view is that it is not desirable to do works of a different class to what are recommended here.

1553. That is their view now, but a new Board coming in might direct works to ten times the amount if they thought fit; the Committee will judge as to the possibility or probability of that contingency?—I should think not; it would be so unreasonable.

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1554. That is so as a matter of fact?—There is nothing here to limit it.

1555. I see that in the general analysis you speak of your works; taking the first one, Lambeth, 655 feet run of walls four feet high, you take it at the same price for every piece of wall raised the same height?—Yes, I have fixed the price for a wall of a certain height.

1556. That will largely depend upon the consideration you mentioned yourself, namely, the consideration of the foundations and the capacity for receiving greater weight?—Yes; where in the Wandsworth district, for instance, I thought the foundations were not fit to receive the walls, I have put down a sum to make them fit.

1557. You will not say that in Lambeth every wall is equally fit for every superincumbent weight?—I think every one is sufficient that I have proposed.

1558. Have you examined the foundations?—I have not examined them, but I see them standing there with weights upon them; and I have no doubt they will stand the additional weight of one, two, or three feet of wall put upon them.

1559. In a tidal river it is desirous to ascertain the details before you order the works?—I can form a pretty good opinion.

1560. Have you examined them since the last occasion, or not?—No; I had examined them before.

1561. I do not want to refer to anything which is not clear, but how is that consistent. Your statement that it requires six months to go through the condition of things. I will draw your attention to the particular passage I mean: "The learned Counsel talks of every plan in detail. I think it well to explain at once that all I propose to give, and all that I can give at the present time, is a section showing the length of any particular wall that is to be raised, and the height which it is proposed to be raised, giving my opinion of the best way to raise it, and the cost. I cannot go further into detail than that. If greater detail is required, it means that I must go to each one of the wharves, and make a detailed plan of the character of the foundations, and what character of work is to be done, and get out a still further detailed plan; that could not be done in less than six months"—That is a sound opinion, and I adhere to it.

1562. It will have to be done before the works are carried out?—Undoubtedly.

1563. And when you have done it, you will be in a much better position to judge than now?—You know that in coming to Parliament you produce certain plans and sections, and if you get your Act of Parliament you can go into things of detail, and prepare detailed or contractor's drawings and plans; that would have to be done here as in all other cases.

1564. When you are coming to Parliament for power to do certain things from time to time, not merely a particular work, but asking for the right to do works from time to time, is it not necessary to give greater detail?—I think not.

1565. That is for the Committee to judge?—I think that a greater amount of detail has been given to the opponents in this case than has ever been given before in any such case.

1566. Has there been any similar case before?—No, hardly.

1567. I thought you would be obliged to say that. In all these waterside premises the Metropolitan Board of Works have found to their cost that the question of compensation is not only a very serious one, but a very uncertain one?—The same remark applies to your question, that there is no similar case to this.

1568. I do not ask about a similar case, but I ask whether in dealing with waterside premises you have not found the question of compensation to be a very serious and a very difficult one?—What do you mean by "dealing."

1569. I will give an illustration: when you came to make the embankment in front of Messrs. Gwynne's, near the Temple, was not that so?—Yes.

1570. And the other case which has become a leading case, McCarthy's?—Those are totally different cases; those were depriving the premises of their water rights, which is not proposed here.

1571. You do assume here that you may deprive them of something, because you expressly exclude the compensation?—My opinion is that we shall not deprive them.

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1572. You anticipate that some persons will say you do?—I have no doubt claims will be raised.

1573. And that will be a question which will have to be judged?—Yes.

1574. And you, no more than anyone else, can tell the result?—No.

Cross-examined by Mr. Pember.

1575. Following my learned friend's question, I daresay you know Messrs. Dowson's Wharf in the Limehouse district; it is a dry timber dock?—What is the number?

1576. 648 *b.*; you have 900 feet of wall, 3 feet high?—Nine hundred feet of wall, 3 feet high.

1577. In my copy it has been put into the wrong column; I daresay you know that in carrying on Messrs. Dowson's business it is essential to have the whole area of their dock available for transhipping the goods; their timber, for instance?—No doubt it is.

1578. And that the timber which forms the material part of their business is extremely heavy and bulky?—Yes.

1579. How do you propose that they should carry on their business if they are to have above the level of their dock a wall 3 feet high raised?—What is the particular operation that they want to carry on?

1580. You know what the general business that they carry on there is, hauling these enormous logs of timber backwards and forwards to and from their dock; how is it to be done if they have to get it over a wall 3 feet high?—It may be done as in many similar cases, by having slides in those walls which will take out for them to run their timber in, and refix those openings.

1581. Then you intend to limit them in their dock to certain apertures, is that it?—I am suggesting that as one way in which it may be done.

1582. Would not it be a most serious limitation of their business; at present they can carry it on wherever a ship happens to be lying?—I do not know sufficient of the details as to how they can carry on their business.

1583. Speaking to you as a person of very considerable knowledge and acumen, does it not strike you that it must be a very serious limitation of the business power of their wharf?—That is just a detail that I say I am not in a position to give you now detailed information upon. If I were called in to devise a mode for raising that dock it is probable that I should not put a wall 3 feet high, but that I should consider the character of the business, and suggest some plan which would be much more easy to them than simply putting a wall.

1584. That is a tolerably important detail which you, in your scheme, have not thoroughly considered?—To do that to the whole of the waterside premises would take me, as I said, six months.

1585. That I am desirous of impressing upon the Committee; supposing you are obliged to carry your wall three feet high round this place, in order to get your general level of five feet above Trinity high-water mark, you are obliged to do that at serious inconvenience and loss to their business. Is not that one of the details which may run into a lot of money in the way of compensation?—What I wish to represent to the Committee is, that in considering those details of each of those particular cases, means may be devised of doing it with very little inconvenience to the business. I believe that it is quite possible that the general level of that wharf might be raised with great advantage, having a slope.

1586. That would cost a lot of money?—No doubt it would.

1587. That is just the point; you cannot tell unless you go into those details in a manner satisfactory to the persons, what the cost of this scheme will be?—I can tell you, and have told you what the cost will be for excluding the tide from those premises.

1588. Provided that there are no works inferentially necessary, but for instance, you have just suggested the possible contingency yourself, that Messrs. Dowson's wharf or dock may be raised three feet all over with advantage, that would more than double or treble the cost you ascribe to Limehouse?—It may or may not be so.

1589. Is not it a fact that this dry dock of Messrs. Dowson's is surrounded by piles to which the vessels are all moored?—In the river?

1590. Yes?



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1590. Yes?—I cannot answer that question.

1591. Now there is Mr. Spence's; do you know the dry dock of Messrs. Spence and Amor's, 690 b.; the last one in Limehouse?—

1592. Sir George Elliot.] Can you put in a tracing of what you are now talking about?—The learned Counsel has a tracing.

1593. Mr. Littler.] The red line represents the height of five feet above Trinity high-water mark, to which you would propose to raise everything along the river side?—Yes.

1594. And the blue line represents the existing high-water mark?—Yes.

1595. Then those upright lines in the plan represent cross-sections, or transverse sections of the buildings, and the interstices?—Yes, they are sections of the buildings and the openings.

1596. So that those below the red line would let in the water at the height of five feet, and those that are not will not?—That is so.

1597. Now I should like to ask you this, while the honourable Members have that plan before them, looking at that 648th, it is the fact, is it not, that the whole of Messrs. Dowson's premises are considerably above the Trinity high-water mark?—Yes, above high-water mark. I would suggest to the Committee probably the most convenient way of dealing with Messrs. Dowson's premises would be to run that wall round their boundary, if there is that inconvenience of running it round the dock, so that if a flood takes place it will prevent their premises being flooded.

1598. Do not they want to go in doors as well as out of doors?—That is to leave them as they are.

1599. You would hardly have them as they are if you put a door sill three feet high at the front door, specially if they have to draw heavy waggons over it?—That is to be removed, except when there is no business going on.

1600. Then we must not lose sight of the fact that, supposing you did that, and supposing Messrs. Dowson wanted to turn the landward side of their premises to any other purposes, they are saddled with this perpetual obstruction, except at certain openings of three feet; it would be a great detriment to the premises, and you would have to take all these things into consideration?—I do not understand the difficulty.

1601. Supposing I had a piece of land flush with the street, it might be valuable for a site for building. I could make openings to the street, but if I had suddenly reared up in front of my sill a three foot-wall, which I have to surmount, that is *pro tanto* a detriment to my site?—No, I think not.

1602. Why not?—Because if you build any new building in the street you would build this building with a floor level with the street.

1603. That is so much more expense in making the building?—No, I think not; that is to say, you would be at the expense of putting your building above the level at which it would be flooded.

1604. Is there any public place in the district of the Limehouse Board which the Limehouse Board have not made inaccessible to floods; is there any spot over which they have any control under the Act of 1855 which they have not made inaccessible to floods?—I cannot answer that question offhand; if there is any such place it appears upon my section.

1605. As we are a little tender upon the point of our administrative energy, we should like to know where you have found us in fault?—My schedule does not show the owners of the different properties.

1606. You have been down to see the condition of things at Limehouse, have you not?—Yes, but I do not remember all the premises that I see.

1607. You will say that we have done our work pretty well, will not you?—The Limehouse Board have acted pretty well.

1608. I am speaking of Mr. Dowson's again; has Mr. Dowson's dock ever been flooded at all?—I have no doubt that it has.

1609. What makes you say that you have no doubt that it has?—Judging by its level.

1610. It either has or has not; you do not know as a fact that it has, do you?—I have not seen it flooded myself; but I have no doubt from its level that it must have been flooded.

1611. What is its level?—It is three feet above Trinity high-water mark,  
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Sir J. Buxalotte. and we have had the tide four feet above Trinity high-water mark, and therefore it must have been flooded.

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1612. Is that the lowest part of it?—No, the highest part of it.

1613. If it is the fact that it never has been flooded, are you sure that you have had a flood four feet above Trinity?—Yes, there is no doubt of that.

1614. I am not scientific enough to know; does the tide vary in height in different places?—No. When I say no, I mean within a reasonable distance; it varies if you take the whole river, but as we are speaking now of different premises in London, it may be taken to be about the same height, practically the same.

1615. I do not want to get into a discussion about a subject which I do not understand very well, but it does vary according to the width of the river, does not it?—Theoretically it does, but not appreciably.

1616. I do not go through all the wharves with you, but I mentioned one as Messrs. Spence's; there it is the fact that you have 1,000 feet of wall, one foot high?—Yes.

1617. Then there is Messrs. Middleton, Son, & Co., 650 b., that is a very small affair, 25 feet; what is the total amount of wall that you propose to put in this way against premises in the Limehouse district?—In the Limehouse district there are 55 feet of river walls to be raised four feet high, 1,150 feet to be raised three feet high; 295 feet to be raised two feet high; 2,085 feet to be raised one foot high; 720 feet of parapet walls to be raised three inches.

1618. That is about 3,500 feet of wall?—There are other works in addition.

1619. There are 3,500 feet of wall of a substantial height, one foot and upwards?—Yes.

1620. About 1,500 feet up to three feet, and the rest between three feet and one foot?—No, not so much; 1,200 feet of 3 feet.

1621. It is 1,200 feet of three feet and upwards, and then it is 1,600 feet about two feet and upwards, and then 3,700 feet of one foot and upwards, that is about right, speaking roughly?—Yes, that is about right.

1622. What provision is there in your Bill for keeping these things in order?—I have not looked at it to see.

1623. You do not know of any?—I apprehend that there is no limit to the time of the Bill, and therefore if they get out of order the authorities, whoever they may be, would have the power to call upon the parties to make them good.

1624. You said that the Limehouse Board have done a great deal in their district; as this is a very rough-and-ready method that you propose of dealing with this question, why should not the local authorities constituted by the Act of 1855, be left to carry these rough-and-ready remedies out; here you have a good instance of one which has done its work up to this time; why not give the requisite power and let it do its work still?—For the same reason that it is desirable to have a governing board for all works affecting the metropolis.

1625. It was not so considered in 1855; what is the change of circumstances making it necessary now to have local self-government in London?—1855 was the time when the Metropolis Local Government Act was passed, and it was decided then by Parliament that a central body should be formed, and it was desirable that the central body should have a certain control over the local bodies.

1626. That we do not object to?—And that applies to this case as well as any other case.

1627. There are Sections 69 and 70; why not amplify those, and let the local people carry out what is necessary here?—I am not prepared to give any reason for it.

1628. I gather that you told my learned friend, Mr. Littler, that this was not your original plan?—What plan?

1629. The plan you proposed this morning to the Committee was not your original plan which you thought of originally as the best way to do this?—I have never gone into it in the same detail.

1630. But it was not the idea you had in your mind?—Yes, it was.

1631. To do it in this way?—Yes.

1632-4. What did the 250,000 *l.* refer to?—I am afraid I cannot tell without having my report before me to refresh my memory as to what it was.

1635. I will

1635. I will pass from that, and ask you what guarantee is there in the Bill that this plan of yours will be the plan carried out?—I do not think there is any guarantee. Sir J. Basalgette.  
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1636. Since this plan was matured to the extent to which we may now call it matured, and these estimates have been made, has there been any amendment whatever made in the Bill?—None that I am aware of.

1637. Therefore, in spite of this plan and estimate having been put upon this table, the unlimited powers of the Metropolitan Board of Works will still exist?—They will, and they ought to do so, I think.

1638. And of course the moment this plan of yours, if it serves the turn of obtaining this Bill, has served its turn, may be abandoned?—No doubt it will have to be varied considerably in many cases. The plan put before the Committee at this moment is my idea, for which alone I am responsible of the way to carry out the works; various objections may be raised to this plan, as they have been by the learned Counsel to-day in opposition to the Bill, and the Metropolitan Board of Works will consider the objections, and modify the plans and perfect them, and it must be subject to that.

1639. Do not you think it would really have been more in accordance with the usual practice, that where an important body like the Metropolitan Board of Works come and say, "We wish to have a certain work for a certain definite purpose entrusted to us to carry out," that they should come to Parliament and tell them what their plans for carrying out the works were?—No; I think it would have been simply impossible.

1640. You say it was simply impossible?—Yes.

1641. It will be done some day?—It will.

1642. Why should not it be done to day as well as six months hence?—Because it would occupy a very long time; it would require a number of parties to be brought together.

1643. Why did not you bring them together before you came for your Bill?—It was impossible.

1644. There would be an unlimited power first, and, six months afterwards another plan?—You cannot make an owner come and consult with you as to how his premises shall be raised, unless you have the authority to do it.

#### Cross-examined by Mr. Bidder.

1645. Just let me ask you one or two questions generally; I am not going into any details upon the plans that you have sent to us; but you have told the Committee that the sums 18,000 £. and 31,000 £., roughly 50,000 £., on the north and south side of the river, are exclusive of compensation?—Yes.

1646. Am I to understand that you have not gone into the question of compensation?—I have not.

1647. That is contrary to your usual practice, is it not, in preparing estimates of river-side works?—Personally, I have nothing to do with compensation.

1648. I mean the practice of the Board?—Where it can be done, it is their practice.

1649. Here you have dealt with each case individually?—Yes.

1650. You have determined what is to be done in each individual case?—Yes.

1651. You have just the same opportunity of considering the question of compensation as you had upon the Millbank extension, that I had the pleasure of meeting you upon in another room yesterday?—No; I think it is a much more difficult question.

1652. Why is it more difficult to assess the compensation, in the case of works for making good the wharves in St. Saviour's district, than it is to assess the compensation when you lay out an improvement affecting the wharves in Millbank?—As I said before, I am not the person who makes compensations; but I can understand it sufficiently to see that it is one thing to estimate the value of premises, buying them out and out, and another thing to take into con-

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sideration what the effect of a particular work may be upon the business to be carried on, and how far it may affect that business; what compensation should be paid.

1653. It is a very probable thing that the figures you have given us as the cost of the works may be a mere bagatelle, as compared with compensation?—I have not the least idea; it cannot be so, in my opinion.

1654. Are you clearly of that opinion?—Yes.

1655. And have always been of that opinion?—Yes.

1656. Let me remind you of what you said before upon this question, in your report to the Metropolitan Board of Works. I find, when you were cross-examined on the 9th of May by my learned friend Mr. Williams, at Question 421, page 30, you gave evidence to the effect, in your report to the Board, that the works of this kind would probably, with compensation, come to 500,000*l.* or 600,000*l.*?—I do not remember that.

1657. I am reading from the report to the Board of Works that Mr. Williams quoted, at Question 421, and as all the honourable Members of the Committee have got Question 421, and have not got the report, I will read it from there: "The resolutions of the Board, of the 10th instant, directing me to report as to the probable cost of the works necessary to prevent the overflow of the Thames within the area of the metropolis, involves considerations so wide that it will be necessary to define more clearly what is intended before such estimate can be formed. If, on the other hand, it were proposed to form a granite-faced embankment, similar to that which has been constructed at Chelsea, throughout the whole metropolis, this work would alone cost five or six millions; but the alteration of the various private properties, which would have to be made to accommodate them to the line and level of the new embankment, would be so varied, and in some cases of so serious a character, that it is not possible to form any estimate of them, nor of the amount of compensation which would have to be paid for interference with wharves and business premises." I was wrong in saying what I did. Now I come to what you propose: "If, on the other hand, it were proposed to raise the earthen banks in the suburbs by simply enlarging those banks, and to raise wharf and other properties by the formation of a parapet wall upon the existing structures, this might be made effective, although it would have a patchwork appearance, at probably 1-10th cost of the first proposal." Now as the first proposal was 5,000,000*l.* or 6,000,000*l.*, plus the compensation, the amount of which no man knew, the tenth of it would be roughly 500,000*l.* or 600,000*l.*, plus something else:—You would hardly call that an estimate, I suppose.

1658. Yes, I do, an approximate estimate; it was your report to your own Board for their guidance?—I will take it so, if you please. I will take it, I said, that if it was done it would be done at one-tenth of the cost, and you put it at 500,000 *l.*; when I go into the matter I find that half of that work has since been done, and the other half may be done for 50,000 *l.*; that is much less than I thought it would be done for then.

1659. We have not done with the Report yet; we have another little paragraph to discuss yet before you are out of the wood: "But even under this arrangement" (I call the attention of the Committee specially to this), "but even under this arrangement very extensive alterations would have to be made to wharf and private property, and the claims for injuriously affecting them would be very heavy, and it would be scarcely possible to form any estimate of these items beforehand"?—That is my opinion still.

1660. Is it your opinion still?—My opinion is, as I stated before, that the claims would be very heavy, and my opinion is that the compensation ought not to be very heavy.

1661. That is a very neat way of putting it, but you are not out of the wood yet; this is your Report to the Board: "But even under this arrangement very extensive alterations would have to be made to wharf and private property, and the claims for injuriously affecting them would be very heavy, and it would be scarcely possible to form any estimate of these items beforehand"?—Yes.

1662. That is your opinion still?—Yes.

1663. And that these works which you estimate at 50,000 *l.* will not, in your judgment, involve very heavy claims for the injurious affecting of private properties

perties as to which it is impossible to fix any limit beforehand?—I have no doubt the claims would be very heavy. Sir J. Bazalgette.

1664. Therefore I am not wrong in saying that the figures which you put before the Committee for construction may be a bagatelle as compared with the claims?—The claims, no doubt, would be very heavy, but as to how the claims will be dealt with—— 7 June 1877.

1665. Do you mean that you wish the Committee to understand when you are reporting for the guidance of your own Board, and said the claims would be very heavy, that you meant that they would be illusory claims?—I think they would be enormously heavy compared with what they ought to be.

1666. What did you want to convey to the mind of your Board?—I intended to convey this opinion, that very heavy claims would be made where no claims ought to be made at all.

1667. You do not say anything of it here?—I said so in my evidence. I have gone so far as to say that the owners of the wharf property should make the alteration themselves, without making any claims.

1668. You still agree with what you end the extract with, that it would be scarcely possible beforehand to make any estimate of the items?—I think no estimate can be framed. I fear that it would be very much in excess of what my notion would be of the demands of justice.

1669. In ordinary cases in which you have hitherto had to deal with riverside works, heavy compensation claims, you yourselves have done the works, and you yourselves have had to pay the compensation?—No doubt.

1670. Here you order what works you please, and somebody else will have to pay the compensation; in this case if this Bill passes you will order whatever works you please, and the compensation will be no business of yours; somebody else will have to pay it, whether great or small?—I do not suppose that when you say “you,” you speak of the Metropolitan Board of Works.

1671. The Board would order the works, and the district would have to pay the compensation?—And the Board represent the district.

1672. The Metropolitan Board of Works order the works, but the payment of the compensation will be not by the Metropolitan Board of Works, but the particular district?—And that district is part of their district, and they are interested in that district. The whole of their area is made up of districts, and they have as much interest in one part of the area as in another.

1673. The Committee can judge of the extent to which that exists; that is not all; I might go as far as this, that where there was a heavy claim for compensation you might make the owner of the property pay his own compensation?—I apprehend so.

1673.\* It would be a very ingenious way of getting rid of it?—

Cross-examined by Mr. Richards.

1674. I should be prepared to ask questions on behalf of the Conservancy of the Thames, but you have not sent any copy of the plans, I believe; is not that so?—That is so. What I undertook to do was to send a copy of so much of the plans relating to a particular portion of the area along the line of the Thames, but I was unable to supply a copy of all of it to the Thames Conservators. The Thames Conservators have a general interest in the Thames, but not in the premises along the Thames, and therefore all I could do was to intimate to the Thames Conservators that if they would come and look at my plans I should be happy to show them to them, and give every information that I could.

1675. You did not send to the Thames Conservators, in whom the soil, bed, and shores of the Thames are vested, any copies, though you did to the various local boards along the bank?—No, I did not; time did not enable me to do so.

1676. You said their application was ridiculous, or something of that sort?—I might have thought so, but I do not think I said so.

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1677. You

*Sir J. Russell.* 1677. You wrote it?—No.

7 June 1877. 1678. Mr. Cripps.] Have you the note that you sent?—I am sure a polite note was sent.

1679. What are all the sections in length; 200 feet?—I do not know the length of them; it was simply impossible to do it in the time, and a great effort has been made to supply all the information that we have given.

Cross-examined by Mr. Williams.

1680. In the Report to which my learned friend Mr. Bidder has alluded, do you suggest a third alteration. First, there is the suggestion of the embankment. This is a report made to the Board on the 20th March 1876. First, there is the suggestion which has been read to you by my learned friend Mr. Bidder, of constructing a work which would cost 5,000,000 *l.* or 6,000,000 *l.*, but that was not to include the compensation to be paid to the proprietors; then there is a second suggestion, of raising the earthen banks now in existence, which would have, as you say, a patchwork appearance?—No; where do you find that?

1681. In paragraph 2 of your report: "If, on the other hand, it were proposed to raise the earthen banks in the suburbs by simply enlarging those banks, and to raise wharf and other properties by the formation of a parapet wall upon the existing structures, this might be made effective, although it would have a patchwork appearance, at probably one-tenth cost of the first proposal"?—Yes; I did not say raising the earthen banks would have a patchwork appearance, because it would not.

1682. Here are your words, "By the formation of a parapet wall upon the existing structures this might be made effective, although it would have a patchwork appearance," and that you say would be done at one-tenth of the cost, that is one-tenth of the 5,000,000 *l.* or 6,000,000 *l.*?—The learned Counsel, Mr. Bidder, ties me to this as an estimate; but I say there, probably one-tenth the cost.

1683. Now there is a third suggestion, which is contained in your third paragraph. "Since the Board have completed the survey and levels along the fore-shore of the river, we know that about 30 of the owners of property have raised, or are now raising their banks, as shown on accompanying list; probably more have done so, or would do so without hesitation if required by some recognised authority. The work done under this arrangement would be generally of the character of that described under Heading 2, but the owners or occupiers would in that event find means to carry on their business without such extensive alterations of their property as they would expect if the work were done out of public expenditure, and the claims for compensation would not arise"?—I am much obliged to you for your suggestion, because it shows that my estimate of one-tenth of the cost on 500,000 *l.* had reference to work done by a public body, and I have always contended that the same character of work done by private individuals would be very much less costly than if required to be done by a public authority.

1684. This is a scheme to be done by a public body; that is a question that I have not yet come to. "They would moreover be enabled to do the work in such manner and under such arrangements as would be most convenient to themselves, which a public body executing works under contract could not do"?—Yes.

1685. Then you say, this is what I want to draw your attention to particularly: "There would still remain some public roads, drawdocks, creeks and rivers, where public works would have to be executed, but these, so far as we can at present judge, ought not in such event to exceed 100,000 *l.*" Now that 100,000 *l.* is an additional estimate to the previous estimate that you had made?—That was my idea at that time.

1686. Is that 100,000 *l.* to be added to the present estimate that you bring before the Committee?—No; a very large proportion of that work has been done by the bodies themselves since then.

1687. Is

1687. Is any portion of the 100,000 £. to be added to the estimate now before the honourable Committee?—None whatever.

1688. Then in the estimate now before the Committee, is it the fact that you have made no allowance for anything in connection with public roads, draw-docks, creeks, or rivers?—That is not the fact.

1689. How do you meet it?—I have made provision for everything.

1690. Generally speaking, you say this 100,000 £. is not included in your first estimate; have you made provision for public roads, draw-docks, creeks, and rivers in your estimate?—I have made provision for everything.

1691. You have made provision for everything?—Yes, I have made provision for everything.

1692. Have you made provision for public roads, drawdocks, creeks, and rivers in your present estimate?—Those remaining to be done, but since I wrote that report the greater part of the works have been done by the dock companies and the vestries and district boards; the dock companies principally.

1693. You say so much of the work as you think necessary to be done is included in your present estimate before the Committee?—Yes.

1694. Now I want to ask some questions about the district of Fulham; have you been to that district since our last meeting here?—No, I have not.

1695. Has this estimate been submitted in consequence of the previous knowledge that you had on previous surveys that you had made of the district?—On previous surveys made and additional surveys made since.

1696. You have been over the ground yourself at some time or other?—Yes, many times.

1697. I suppose you will say that the suggestions you make for the Fulham district are of a patchwork character, to use your own suggestion?—Yes. When I speak of the patchwork character I mean as compared with a uniform embankment along the river.

1698. You have already given us a definition of the patchwork character not entirely consistent with the one you now give; patchwork character means making use of such appliances as at present exist for keeping out the water, but now you mean a uniform embankment on the banks of the Thames?—No; I say a uniform embankment is not patchwork.

1699. Anything but that is patchwork?—No, I do not say that.

1700. I will repeat the question put by my learned friend; you have not included any estimate as compensation for entering upon land or taking possession of land?—No; my estimate is for works.

1701. Is it not the fact that in the Fulham district you propose to meet the exigencies of the case by raising the walls of private proprietors, and the earthworks of private proprietors too?—Yes; most of these works are of that character.

1702. And you have made no estimate of what you would have to pay them for exercising any right over their property?—No.

1703. Now let us begin at the earthwork. It commences in the Fulham district immediately after passing the West London Extension Bridge, marked 4 upon the map?—If you will refer to the reference number it will save a great deal of time.

1704. It is numbered B. 105 upon your section. I want the first earthwork after passing the bridge of the West London Extension Railway; the first earthwork on the north side of the river after passing that bridge?—B. 105 has been raised already by private individuals to the full height that they are going to be raised there.

1705. Your requirement as to that is that it shall be raised 2 feet?—I am right as to B. 105.

1706. I do not profess to have given you the correct number. I call attention to the first earthwork immediately after passing the railway bridge?—Still, if you cannot identify it, I cannot identify it for you.

1707. B. 104?—B. 104 is a long earthen bank, 2,800 feet, requiring to be raised 2 feet higher than it now is.

1708. Now have you measured the width of that bank at its top?—No, I have not.



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1709. Would you be surprised to hear that it is no more than 18 inches in width?—No, it is very narrow.

1710. Would it be possible with any safety, or any advantage whatever, to build a wall of 2 feet upon that bank?—I do not propose to do anything of the kind.

1711. What do you propose; to raise the bank itself?—To raise and strengthen the bank.

1712. By strengthening, you mean you would increase its base?—Yes.

1713. Have you included the increasing of the base of that earthen embankment in the estimate that you give?—Yes.

1714. So that you can increase the base and raise it two feet for the sum you estimate?—Yes.

1715. You have made no allowance for anything to be paid to the proprietor for the widening of the base?—No.

1716. The whole of that earthen bank, extending over 2,800 feet, is on private property?—Yes, that goes through Steel's Gardens in the rear of the saltings.

1717. That earthen bank does not go along the banks of the River Thames?—No.

1718. It is inland?—Yes.

1719. How far is that bank from the river?—Those saltings go in, I suppose, speaking from memory, perhaps 50 or 60 yards.

1720. Are you sure it is not four times that?—It may be in some places.

1721. In some places you cannot say it is not 300 yards?—The bank takes a direct line where the river is in curve, and the saltings are in front of it.

1722. If we cannot agree upon the distance of the bank, you will allow that land of a considerable area is left unprotected between the bank and the river?—Yes; those saltings are of value on account of the overflow of the river, and if one were to attempt to include them there would be a claim raised for compensation directly.

1723. Would it not be of great waste of property, to whomsoever it might belong, to construct a bank 300 yards from the river, and let this land be destroyed and rendered useless?—It is clear that the owner of the property does not regard it as wasted property, for he has done so.

1724. Would not it be more desirable that this land were saved by having something along the banks of the river to prevent the tide overflowing it?—No doubt the people of Fulham would like the saltings to be reclaimed at the public expense, turning their saltings into building lands; but it would not be justice.

1725. Do not you know that the area of the land you leave thus exposed exceeds 28 acres?—I have no doubt it does. I am following simply what the owners of property have done before; they have in that line, for good reasons, formed a bank, but they have not formed that bank high enough, and I propose to raise it a couple of feet higher.

1726. But the bank is not in a good state of repair now; this bank of 2,800 feet long, the tide has gone over it where there has been a breach formed, but it has been repaired, and the last tides covered it?—They are very busy now in that district raising the banks themselves.

1727. After leaving this bank of 2,800 yards, do you come down to a public footpath that has been improved recently by the Fulham Board of Works, *b.* 101; what is the length of that footpath?—That is the same level as the bank which has been raised. It is constructed the right height, and nothing is required to be done there.

1728. That is a public path?—Yes.

1729. What is the length of that?—It is a continuation of the bank we have been talking of.

1730. The other is on private property; what is the length of this public path which the Fulham Board of Works have improved?—About 1,500 feet.

1731. When you begin with the path, how do you connect it with the earth bank we have just been describing, and how do you connect the continuation of the fence?—There is the Victoria Wharf intervening between them, which Victoria Wharf has to be raised; the bank runs up to Wandsworth Bridge, and  
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your road runs up to Victoria Wharf; it is proposed to raise the camp shedding of Victoria Wharf.

1732. Do you make a wall from the earth bank perpendicularly down to the public path?—No.

1733. Nor the bank?—No.

1734. How do you connect them; do they form a straight line?—They do not connect; there is a wharf between them.

1735. You leave it open?—No, that is raised.

1736. What is raised?—Victoria Wharf.

1737. I am speaking of the ground that intervenes between the earth bank and the public footpath; the road to Wandsworth Bridge; how do you come at them?—By the bank; that returns to it.

1738. Then that bank does not run in a straight line?—No.

1739. It comes down in a perpendicular way?—Not in a perpendicular way.

1740. It comes down in a zigzag way, does not it; you do not remember?—I know the bank is run back to fill up the link.

1741. Now as to the public footway, do you raise that?—No, we do not; you have done it for us.

1742. That has been done?—Yes.

1743. That is a public footway, and it is our duty to do it?—Yes, it is one of the numerous works we found done since January last.

1744. It does not run up the bank of the river?—No.

1745. It runs somewhat inland, leaving along its line a certain portion of ground exposed to the river?—It leaves the saltings there.

1746. Do you know the ground there occupied by trees belonging to Miss Sullivan?—I do not know who they belong to; some have recently been removed or cut down since I saw them.

1747. Do you know the area of the ground between the public path and the river you leave exposed to the river?—No, I did not measure the area.

1748. Is it not about 30 acres?—Probably.

1749. Sir *George Elliot*.] It is not upon this plan?—No, these are saltings upon the bank of a river, overflowed at high water, and the banks to protect the property are placed at the back of the saltings, and some of them are osier beds.

1750. Mr. *Williams*.] Are you aware what the cost of improving the public path was to the Fulham Board of Works?—No, I do not know; nothing very heavy.

1751. Was it 1,800 *l.*?—Possibly it was; I do not know; I should have thought not.

1752. Does it surprise you?—I should have thought it would not have cost as much as that; that seems a large sum.

1753. Then, after leaving that public road, do we come upon property belonging to the Ecclesiastical Commissioners?—I cannot tell the ownership.

1754. Before I leave the land left exposed there by the riverside, I will ask did you notice the action of the tide upon that land?—Yes.

1755. It is undermining the whole of it, is it not?—The mudbanks are washed away at times.

1756. The banks are undermined, and some of the trees have fallen down on account of the undermining?—Yes.

1757. After leaving the public path, we come to land occupied by the Ecclesiastical Commissioners; are they engaged in embanking; it is B. 96 and B. 97?—They have raised a substantial earthen bank to a greater height than is necessary.

1758. Where is that bank raised; on the river edge, is it not; it is not inland like your proposal?—It is on the river; it runs to the end of the saltings and is raised along the river.

1759. Now we come to the Willow Bank?—Ninety-five.

1760. That is a nine-inch wall, is it not?—Yes, it wants raising a foot higher.

1761. That is a nine-inch wall, is it?—Yes.

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1762. How do you propose raising it?—Putting a wall upon the top of it.

1763. Building on the top of it?—Yes.

1764. Will it stand?—Yes, certainly.

1765-66. The same suggestion applies to every wall as you go up the river; walls that are now private property, nine-inch walls, you propose to raise various heights of two, three, and one foot; do you think that can be done with safety?—Yes.

1767. And that it would have the beneficial effect contemplated of keeping out the tide and resisting the weight of water, and the flow of the water?—Yes; you are aware, as I have stated, that at Fulham there are some of the walls in a bad condition, and I have put down 1,200*l.* for repairing the existing walls.

1768. Now I will go to the wall at Hammersmith Bridge; a wall commences there; 650 feet of wall; 52 B. to 57 B.; your proposal there is, that this wall of 650 feet is to be raised four feet; this is a wall which commences at Hammersmith Bridge; is that possible, unless there is an embankment of earthwork put at the back of it?—Quite.

1769. You do not propose to support the wall in any way?—No.

1770. That is an old wall in a tumble-down state?—It will carry that parapet. The parapet will strengthen it rather than otherwise.

1771. It is a tumble-down broken wall, actually falling down, is it not?—No, I think not.

1772. Do you think that wall can be raised four feet with safety?—I think that parapet can be put upon it with great safety.

1773. Now we come to the Creek; that wall is opposite a terrace of houses, is it not?—Yes.

1774. Would not the raising of the wall four feet affect the view and the value of the houses opposite?—No, I do not think it will affect their view; the windows are above the level.

1775. Would not it interfere with the entrances to the riverside from the houses?—There are no entrances to the riverside.

1776. I beg your pardon, there are; I saw them myself?—If there are any places where they go to take boats, there is no difficulty in having those. I do not think there are any over the Mall.

1777. The entrance of the houses is by a street?—No, the street is the other side, and does not affect it at all; those houses have gardens; they lie back from the road, therefore it would not affect them at all.

1778. Then there is a public road; there is a wall of 910 feet, which you propose to raise a foot; is not that wall in a very dilapidated state; it is 18 B. to 28 B.?—Yes, upon that we propose to put 840 feet of parapet wall one foot high, and 70 feet two feet high.

1779. The question I ask is, is not that wall at the present moment in a very dilapidated state?—No; it is an old wall, but it is not in a dilapidated state.

1780. Can you with safety make any addition to that wall?—Yes, with perfect safety.

1781. Then, when we come to the Chiswick-road, that is the end of the metropolitan area?—Yes.

1782. Do you propose that the road should be raised on the Chiswick side?—Yes.

1783. What means have you of compelling the people on the Chiswick side to raise the road to a corresponding level on their side; is there any power in your Bill?—I do not know about that; if not, I will get a little further back, so as not to get beyond the metropolitan boundary.

1784. Of course you raise the road; you will have a sudden dip there?—Yes, it would run out some 50 or 60 feet there.

1785. There is no power to compel the Chiswick people to raise that road?—No.

1786. I have nearly done; but I will ask one general question; there are the temporary provisions you suggest, namely, putting these structures upon old dilapidated walls, and repairing banks that go inland, leaving a large portion of the land exposed to the river; you cannot propose that as a permanent way of keeping

keeping out the water, can you?—I should be inclined to ask whether you consider the walls temporary walls now. What I propose to put would be of a much more permanent character than what is there now, and what has existed and will exist for many years.

1787. They are of a temporary character, are they not?—I do not call them temporary.

1788. They come scarcely up to your description of a patchwork appearance, do they?—Yes, they do.

1789. Your note upon Chiswick wall is, "Raise the Chiswick walls to a summit of 3 feet 6 inches, about 250 feet of road 30 feet wide?—Yes.

1790. How are you to connect the road on the Chiswick side with the road so raised?—I have proposed to put the summit on the boundary, which would have required me to go 125 feet into the Chiswick parish, but if there is any difficulty about it I will put it 125 feet back.

1791. Here is the difficulty, that at 250 you get to a sudden depth?—There is nothing there saying exactly where that is to be placed, or which ties me to it, if it does say so.

Cross-examined by Mr. *Pembroke Stephens*.

1792. One or two questions with regard to the Wandsworth district; you gave an estimate for the north side of a total sum of 18,200 l.?—I did.

1793. And you gave the estimate for Wandsworth of 9,700 l.?—I did.

1794. Without, of course, going into the accuracy or otherwise of the figures at the present moment, it is a fact that the proportion of the expenditure you contemplate in Wandsworth is half as much as will be required, according to your view, for the whole of the north side?—That is so.

1795. On the last occasion when you were examined you were asked a question about the Wandle; that is a river running into the Thames at right angles, and there are questions of flooding connected with it?—Yes.

1796. I think you said that that would have to be dealt with by a totally different arrangement; that was a separate question?—I thought so then, but on looking into it in detail, I have come to a different conclusion, and I propose to deal with it in the same way as I should deal with all other parts of the river.

1797. I thought you had changed your view upon that point; what do you propose now, and how does it differ from your view when you were examined upon a former occasion?—My idea was when I gave an answer to that question, to place gates just across the mouth of the creek in a line with the banks of the river, but I find that that can be more conveniently done by raising a low place in the bank from the Causeway to Red Lion-street, throwing rubbish upon it, and raising a sort of cart road along the bank and making it higher, and then by raising parapet walls along the margin, as I have already described, and also by putting a tidal gate up near the mills, at a much higher point, which will be a much less expensive operation.

1798. How far up the Wandle do you carry your works of embankment, or whatever they may be?—I do not go up to the Wandle proper at all, but I treat that part of the creek into which the Wandle discharges as a part of the River Thames.

1799. Will you mind showing it to me on that plan (*the Witness explained the Plan to the learned Counsel*)?—I find that by my plan the thing is done cheaper and more conveniently than placing gates at the mouth.

1800. Your original plan was to put gates at the mouth?—Yes, I had not gone into that in detail, but now by going into it as I have done, I find the way I propose will be the better of the two. If the tide had been shut out from the osier beds they would have had a claim for the destruction of the osier beds, therefore, we leave everything as it is, and exclude the tide from this property, while the cost of it is 3,000 l. out of the 9,000 l.

1801. Sir *George Elliot*.] You treat this as part of the Thames up to the creek?—Yes, as we go into the subject in detail we find a way of getting over these difficulties.

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1802. £. 3,000 seems a small sum?—Yes.

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1803. Mr. *Mark Stewart*.] You think it can be done for that?—Yes.1804. Mr. *Pembroke Stephens*.] All the works you now describe are the result of surveys made since the last sitting of the Committee?—They are.

1805. Then that is one direct result of the investigation in this room?—Yes; I mean to say that that would have been done before the works were carried out. When I spoke generally of what works would be done, I stated that before the works were carried out each would be carefully examined, and I still say that many of those works now proposed may require modification.

1806. It is generally true of all these works, the details of which you have given us, that when they come to be looked into, some of them may require similar modification?—Clearly.

1807. As I understand, your works upon the Wandle are simply directed to keeping out the Thames?—Yes.

1808. At one point I find that a parapet wall 5 feet high in front of the Brewery will be necessary?—Yes; that is number 22; 200 feet of parapet wall.

1809. What does that mean?—It means a parapet wall; it appears to be open garden ground at the back of it.

1810. You will have to construct at that point a parapet wall 5 feet high?—Yes, in front of that garden.

1811. That would be something that does not exist now?—It would be.

1812. Of course your works, as I understand them, are simply directed to the Thames, and would not do anything with regard to the flooding of the Wandle itself?—No, they have reference to the flooding from the Thames.

1813. They are directed simply to that view?—Yes.

1814. And assuming any inconvenience to arise from floods in the Wandle itself, your works would not alleviate those in any way?—They would not affect it at all.

Cross-examined by Mr. *Philbrick*.

1815. I notice with regard to the properties that I more immediately represent, taking the Middlesex side of London Bridge, that as to all the wharves that go from there to Billingsgate, Queenhithe Wharf, London Bridge Wharf, and Nicholson's Wharf, you propose to put a two-foot wall from London Bridge Wharf to the end of Nicholson's Wharf, next to the river?—I cannot follow you so rapidly.

1816. It is number 280 B. and 281?—Yes.

1817. What do you propose to do there?—We propose at 280 to form 470 feet of brick wall 2 feet high, and at 281, 180 feet of the same.

1818. So that there will be 650 feet, which is a little longer than the frontage of this wharf, of a two-foot wall put between these wharves and the river?—Yes.

1819. These are fruit wharves, chiefly used in the fruit trade; the great fruit trade of London is chiefly carried on at these wharves, among other trades?—I daresay it is so.

1820. Have you considered what the effect of placing a two-foot wall would be with regard to the business of those wharves?—I do not know that it would be very injurious to it.

1821. It would be above the level of the present openings, or else it would be of no use?—Yes.

1822. So that whatever had to be carried on in the way of business, would have to be lifted over a two-foot wall?—Yes.

1823. In practice, a similar obstruction is never adopted by a wharfinger along the Thames, is it?—Yes, in some cases.

1824. It is very exceptional?—A good many of them are doing it now.

1825. I mean except for the necessity of providing against flooding, no man for the purposes of his own trade or business, would put such a bar or line between him and the water?—It is not necessary for the purposes of trade.

1826. Not only is it not necessary, but it is a hindrance to trade. Have you considered whether in the case of this 600 feet wall, it would be possible, if the wall

wall were built, to fill up the level of the wharf, so as to make the floor line of the wharf the same height?—That I cannot say. Sir J. Bazalgette.

1827. That you have not considered?—No.

1828. That is not included in the estimate?—No.

1829. I may take it that that sum of 400 *l.* is the mere cost of the erection of the wall?—£. 450.

1830. That is the mere building of the wall without the cost of the foundation?—Yes.

1831. What foundation is there to build upon at the present moment?—The present wall.

1832. Would it be sufficient to bear what you propose to put upon it?—Yes; it is a timber frontage at present.

1833. You build bricks to the height of two feet on the top of the timber?—Yes, there is no objection to that. I am not particular whether it is brick or continued timber; in all probability what you would do there would be to put a couple of baulks bolted down upon the present wharves.

1834. Your idea at present is a brick-wall parapet?—There is nothing to point out that that is a brick wall.

1835. It is under the column "wall"?—Yes, but there are wooden walls.

1836. The wooden walls one has been accustomed to hear of usually are moveable wooden walls; what had you in your mind when you made the estimate?—I have estimated for a couple of timber baulks.

1837. Merely placing a couple of timber baulks bolted down?—Yes.

1838. On each of those?—Yes.

1839. At Queenhithe and Smith's Wharf you propose 230 feet of 3-foot wall on the east and west side of the docks; it is number 249?—Yes.

1840. There you propose a 3-foot wall?—No, two feet.

1841. Is that the same kind of thing; we think that must be lateral down to the river front?—This is not in the front; there are recesses in this building, and it is the side walls.

1842. But the side walls you propose to be two feet high are fixed; what becomes of the accesses to the side of the property?—The side access is at Queenhithe Stairs.

1843. Take Queenhithe Stairs as they exist, you put up a 2-foot wall of timber; what is to happen to the side accesses?—It is only a footway.

1844. It is all the more awkward; you cannot get over it with a carriage?—You cannot have a cart there.

1845. Then you must clamber over it?—You must step over it; you can put steps if you want to take ladies down there, but the people there have no difficulty in stepping over it.

1846. For the purposes of carrying on the trade, what would you do?—There will not be much difficulty in getting over it.

1847. You will have to get over it the best way you can?—You will have to step over it.

1848. As to the gentlemen I represent, there are only three or four cases upon the Surrey side; have you altered since you made this estimate, at the suggestion of the Committee, the plans and designs you had in your mind when you issued the notice to the various wharfingers in November last?—No.

1849. Can you account for the fact, for it is a fact, that I have in my hand here a notice to the wharfingers on the Surrey side, the gentlemen I represent, to raise their wharves 2 feet, 1 foot 6 inches, a foot, and so forth; you have given these gentlemen notice either to raise their walls and do works, and not one of the works is mentioned in the plan now before the Committee or the estimate before the Committee; can you account for that?—Will you refer to one or two of them?

1850. I cannot give the number, I can give you the names; I will take Chamberlain's Wharf, No. 155 upon the plan?—I think you will find it will turn out that in each of the cases they have done something.

1851. No; in every one of these cases I am prepared to show that these gentlemen have not done a single thing; they have not put up tide boards?—Is that so?

1852. The reply to the Board was that the premises were in a proper state, and that nothing was required to be done?—The reason why we have done

Sir J. Bazalgette. nothing there is that we found at Chamberlain's Wharf they had fitted up planks with clay at the back of them, putting the joints together with clay.  
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1853. That you say with regard to Chamberlain's Wharf; that is the reason, because you found that they had done it?—Yes, we found they were doing something.

1854. Now let me ask you if this evidence is to be of any value before the Committee, and I do not dispute that you are giving them the best impression in your mind; are you prepared to say positively that a single thing has been done since the notice was served in January?—I can only speak to the information I have.

1855. It is reported to you as such?—I have it marked upon my section as such, and that is the reason; in any cases where anything has been done it is left out.

1856. I will now turn to 156, which is Cotton's, and one of the largest wharves on the river; you require them to raise it one foot?—Yes, they fitted all their openings with planks.

1857. But those planks have been there for years?—No, they have not in all cases. I have very carefully marked them. After the service of that letter I sent round to ascertain exactly what had been done, and I have marked upon my section what has been done, and in all the cases you refer to now it is shown that in the loopholes they have fixed planks up to the required height.

1858. Before you pass from Chamberlain's Wharf, let me call attention to this reply of Messrs. Besley's; you required them to raise their wall six inches: "We, the undersigned, who are occupiers of Chamberlain's Wharf, Southwark, acknowledge receipt of communication from the Board, dated the 10th January 1877, in which certain alterations are suggested to be made in these premises on the authority of Sir Joseph Bazalgette; that is, that the frontage of the property should be raised six inches. In carefully perusing the document in question in order to find out by what reasoning the above recommendation is supported, we see that, 'The Board therefore feels it to be its duty to direct the attention of all owners and occupiers of property in the foreshore of the Thames to the necessity of at once taking measures by raising the frontage of the property exposed to inundation to prevent a recurrence of the overflow;' it concerns us to deal principally with Sir Joseph Bazalgette's opinion as regards this property, but inasmuch as the policy of the Board in endorsing his opinion is involved, we would premise our observations by suggesting certain considerations which seem to us to invalidate the wisdom both of Sir Joseph's opinion and of the Board's action, regarded from the point of view of public policy. In the first place, it seems to us that the Board has, in this question of the inundation, adopted the easy but slightly ignoble plan of trying to thrust its responsibilities on to the shoulders of others, and in endeavouring to find a scapegoat has pitched upon the unfortunate parties who happen to be nearest to the scene of the disaster, that is the wharfingers on the river bank. Now it cannot be fairly contended that they the wharfingers are responsible for the building of small house property on situations below the level of high water which have been subject to inundations from time immemorial. These houses, which are inhabited by the poorer classes, were built by persons who must have known the liability to inundation which existed. Do these persons charge less rent in consequence? Do they forego their rent when inundations take place; why should the Board of Works make favourites and tacitly exonerate the landlords of this kind of property from blame, and confine its recommendations, involving great expenses to the wharfingers; why should the Board apply one principle to one side of the river, the Middlesex side, and another principle to the other side, the Surrey side; the population on the Surrey side helped to pay for that costly, ornamental, and until now, little used embankment on the north side; why should the poor Surrey side be refused, when it asks to be treated in the same manner, and its embankment made a metropolitan improvement; those who show themselves so suspiciously ready to talk about the poor when they want to shift their responsibilities on to other people, might examine themselves to see whether the motive they act on is not rather self-glorification; the Board has enormously increased the rate burden of the metropolis, and is no doubt afraid lest the breach of popular agitation which brought it into being should, through the burdens  
cast



cast upon the people, blow the other way, and demand its abolition; but why try to ride off on other people's shoulders. Now with regard to these premises, they have never been inundated even during the highest tides we have known; we have taken precautions from time to time, but it has never yet been found that they were necessary; the premises were so built as to provide against the risk from high tides, and we know by experience that this has been done effectually;" that was written after the highest tide you have any record of in the Thames?—I am not surprised at that remark. These premises we proposed they should raise six inches; that shows that we wanted them to raise them to the level of five feet above Trinity. Now we have it in evidence here that the highest tide was four feet six above Trinity, so that it is true that the tide has just risen to the lip of these premises, but has not yet been over it, but it does not follow that before this year is over it may not be over it the next time, and we say, therefore, to be safe, you must raise your walls six inches higher.

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1859. Then why do not you put it in your estimate, if that be so?—Because I found that they had done what we proposed. In going to those premises, we found that they had put planks, so it is reported to me, and that is the reason why we have not included them.

1860. If it be that the position taken in this letter has been adhered to by these wharfingers, what do you say; ought it to be included in your estimate?—It ought to be, if nothing has been done.

1861. Ought not all these gentlemen, whose wharves are omitted from 2 feet down to 6 inches, to be included in your estimate, provided they have not carried out the works you require?—Provided they have not carried out the necessary works, but I believe they have; the only reason for excluding them is that they have done so. I have sent careful people to make careful surveys, and they have returned with the information marked carefully upon this plan, and I have every reason to believe it is the fact.

1862. I will not trouble you except in one other instance, by way of illustration. No. 161, Gun and Shot Wharf, you wanted them to raise 2 feet; in that case, has anything been done?—Yes.

1863. What has been done?—Brick and boards have been placed there, raising it to the full height.

1864. Was not that done before your notice?—My survey was made before the notice, and it was not done before the survey was made, which may have been a month or two before. It occupied some time; but after the survey was made, and when the survey came before me to look at, I found it was not high enough, and I served the notice; it is possible, between the two dates, that they may have raised it.

1865. Has anything really been done there substantially for some years in that way; was not all this done before that time?—If you ask me, from the best information I have got, I should say it was not.

1866. After the high tide in March 1873 or 1874, were not these very steps, which you say are now satisfactory in the Gun and Shot Wharf, taken by the wharfingers?—This survey that I have before me was made in November 1876. It is a very accurate survey, and I have no doubt it is right.

1867. I cannot press you further?—I cannot go further.

1868. You believe the gentlemen who made your survey?—Yes.

#### Cross-examined by Mr. Clarke.

1869. I want to direct your attention to Bankside; the west side of Southwark Bridge, on the south side of the river, in St. Saviour's; I may take it that the proposal is to carry a wall, or a couple of baulks of timber, along the outside of the wharfage there?—Yes.

1870. Between No. 113 and No. 127, upon the detailed plan, there are 750 feet of wall 3 feet high?—It appears to be so.

1871. And it is proposed to be a timber wall at the outside of the wharf?—No, mostly brick; varying according to what the structure is at the present time; you have taken a long range, and there are various structures; the addition would be of the same character as now exists.

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1872. Is there any retaining wall to the wharfage there?—Yes.
1873. Are you sure?—Yes.
1874. Is not that wharfage only supported by timber struts?—Probably, but it forms a retaining wall.
1875. Would it be sufficient to bear the brick wall that you propose?—I say I would not put brick where there is timber; I would add timber to it.
1876. There is nothing but timber along the whole of that?—Yes, there is; some are brick, 118, 119, 120, 121, 122, 123, 124, and 125, are brick.
1877. Your wall would be partly timber and partly brick?—Yes.
1878. Proposing to leave the wharfage at the present level?—Yes.
1879. I may take it that in this case you have not made any calculation as to the cost of raising the wharfage to the height of the wharf?—I do not propose to raise the wharfage.
1880. Are there not a number of iron wharves along this wharfage?—Yes.
1881. And on the outside of the wharf face there are platforms used in connection with the wharfage, for which a rent is paid to the Thames Conservancy?—What do you mean by “platforms”?
1882. Outside the wharfage face?—A kind of wharf for barges to lie upon?
1883. Yes?—I have no doubt there are.
1884. Supported upon piles, the rent being paid to the Thames Conservancy?—I do not know anything about the rent. I know there are such platforms upon this part of the river.
1885. According to your proposal, to get from the platforms to the wharf, it would be necessary to raise and lower all goods over three-foot walls?—Yes.
1886. In your judgment, would not it be a wiser plan to raise the level of the whole wharf?—It does not follow; it may in some cases be so, and in others it may not. I cannot give a general answer to that.
1887. Generally speaking, with the wharf in two stages, as it is at present, the wharfage, and then the platform at a lower level, would it not be wiser to raise the level of the whole wharf than to raise all the goods over the wall?—It depends upon the character of the wharf.
1888. Would it not be sometimes difficult, looking at the character of the wharf, to make arrangements for getting iron goods over three-foot walls?—I suppose the goods are raised by cranes, and I say it would make very little difference.
1889. But it would be an interference with the business?—Yes, to the extent that you would have another turn or two of the crane to raise them over the wall.
1890. Do you know any places within the district I have pointed out where the putting of such a wall would be an absolute prohibition of the business now carried on?—No.
1891. Do you know Reddin’s Wharf?—The dust wharf?
1892. Yes; I should like to turn to that 121, that is the dust shoot; would not the putting of a wall of the character that you have suggested absolutely prevent the use of those premises in that way?—I do not see why it should.
1893. At present the dust is shot over the edge of the wharf?—Yes.
1894. How would you propose to deal with it; it would be necessary to raise the level of the wharf there?—All it wants is one of the slide boards of the width of a cart to be taken out when they are shooting the dust, and put in again when the shooting is over.
1895. A slide board in the wall?—Yes.
1896. An opening in the wall?—Yes.
1897. Then upon that board, so far as the river is concerned, you would rely for the prevention of floods?—Clearly.
1898. From its being in its place at the time required?—I stated in my examination in chief that my idea was that there should be a fine imposed upon persons who had the hoards out except at such times as the business was being carried on on the premises.
1899. There is no such clause in the Bill; you are aware of that?—There is a power to regulate these things left to the proper authority, and it would not be necessary to put it in the Bill; it would be an arrangement with them.
1900. Do you suggest that such a power is in the Bill as would enable the Metropolitan Board of Works to fine Mr. Reddin for not keeping the gate shut up

up at the proper time?—I presume that there is sufficient power to do it, and if not, I suggest that it should be put in. Sir J. Bazalgette.

1901. As the plan at present shows with a wall, it would prevent the use of premises for his business?—Yes, as I said before, I have not gone into detail. 7 June 1877.

1902. Do you know the drawdock very near the same place, Newton's drawdock, No. 99; there is a drawdock with simply an access by road to the river, and Newton's have no wharfage by the side of it?—Yes.

1903. Would not it be a case of extinction if that aperture should be walled up in the way you suggest?—I do not propose to wall it up. I propose to raise it at the head of the dock to let the water into the dock.

1904. So far as I can judge from this, it would be walled up?—It is not possible, upon a section of that kind, to give all the details.

1905. The people who are affected are anxious to know whether they are bound by this, or not; the suggestion upon this plan is, to wall up the entrance to this drawdock?—That section merely means the raising of the head of that dock, round that dock, to the height that is shown there.

1906. All round the dock?—It does not mean the closing of the dock.

1907. Would not raising the level round the dock be a far greater expense than is indicated by this kind of wall?—There is no necessity to raise it all round the dock; this dock on either side has brick walls, therefore the water cannot overflow there; it is only at the head of the dock.

1908. Am I to take it, as to Newton's, that it is to be dealt with in a different way to what is indicated here, but that it could not be indicated on this plan?—No.

#### Cross-examined by Mr. Armstrong.

1909. I will ask you generally whether you have, in order to make this estimate, surveyed St. Olave's district?—Yes.

1910. Have you personally been over it since the last meeting of the Committee?—No.

1911. When was this survey made?—The survey was made before the meeting of the Committee. I produced this survey before the Committee when I gave my evidence in chief.

1912. And you prepared this estimate since that survey?—Yes; sending out for further information when necessary.

1913. You have let my district off pretty easily; you only give an expenditure of 200 l.?—Yes.

1914. We may take that as a tolerably definite and final estimate of the expense that will be put upon us, or are we to make allowances?—That is the best opinion I can give at the present time; that is the best judgment I can form.

1915. Will these works be of a temporary or a permanent character?—All permanent.

1916. As permanent as the wharves themselves?—Yes.

1917. You do not want for our district to have any public roads or public works?—They are not required.

1918. You only want to put a few gates and raise some walls?—Yes.

1919. You could do all that is to be done in our district without any of the machinery that is asked for in this Bill?—That I do not know; there may be the same difficulty in doing it in your district as in any other; I do not know what powers we may have; I do not express any opinion upon that.

1920. Supposing fresh legislation was to take place upon this matter, is it necessary for what is to be done in St. Olave's district to give all this power to the Metropolitan Board of Works?—It would be as necessary for a small work as for a large one, I should think.

1921. In order to put sliding gates, why do you want power to make roads?—We require power to make the persons put the sliding gates.

1922. But you require no more power than that?—It may be so as to your district.

1923. As far as my district goes, the general powers asked for by the Bill are not wanted?—I do not say that.

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1924. What do they want it for?—That I cannot tell.

1925. Can you suggest what they may be wanted for?—I may suggest that this property may change its character entirely within the next year, and may render necessary an entirely different class of works.

1926. Then I cannot take the comfort you gave me just now as a permanent one?—As the property now stands, but it may be liable to alterations which I cannot foresee.

1927. Supposing the level of the tide was raised, you would want to do something more?—Yes.

1928. What is the general character of the property along the boundary of St. Olave's; do you know whether it is in a good state of preservation as to keeping out the tide or not?—There is a good deal of it protected by boards and slides.

1929. Do you know what state the boards there are now in?—I believe they answer pretty well.

1930. Then you cannot explain what you meant by saying that this estimate would require further modifications, further than by saying that the character of the property may change?—Yes.

1931. Is that all you meant by saying that this plan would require modifications; you did not tell me so, but you told my learned friends that the estimate you submitted would require modification?—No; what I said was that in every case where I have recommended a work it may turn out that when we come to treat with the owners or occupiers of the property, they may suggest some difficulty with respect to it, and something better may be substituted for it.

1932. How much am I to add to the 200 £. for compensation?—That I cannot tell at all.

Cross-examined by Mr. Greene.

1933. In sending in some figures and plans to Messrs. Cory, you say that in No. 74, in Lambeth parish, there is 90 feet run of raised parapet wall?—Yes.

1934. How do you make out the 90 feet; you say 90 feet run of raised parapet wall?—That is the whole width.

1935. That is filling up all the apertures or doorways at present in Messrs. Cory's Wharf?—No, it is not.

1936. Is it putting a wall 4 feet high in each of the apertures or doorways upon their wharf?—It is putting a wall 4 feet high upon their property.

1937. Their property, as it faces the river, has simply doors or apertures opening on to the river?—Yes.

1938. Where do you propose to run the parapet wall?—I will show you. I knew an objection was going to be raised in this case; it is a fair illustration to the Committee of how, in looking at the premises carefully, the work can be done without inconvenience to them. Messrs. Cory have their coal barges brought to the side of the river, and the men carry the sacks of coals up steps on to the platform, and shoot them into carts standing at that platform; that platform exists; all I have to do is to put my 4 feet of wall underneath the platform, and the tide is excluded at once from the premises, without the smallest alteration to their premises, or inconvenience to them. (*The Witness produced a sketch of Messrs. Cory's Wharf*). Now I can suggest in the same way if difficulties are raised, and I have time to visit the places, many similar ways of getting over the difficulties suggested. Then they want to get room for the men to walk round at certain places at the side of the wharf; there I should put boards which would take out and put in, to let them go by, the main bulk of the work being permanent.

1939. This sketch was not submitted by you, or sent in with the other matters that you did send in?—No, I sent to Mr. Cory what I have sent to other people.

1940. But this which is detail with special reference to that wharf, you have not sent?—No.

1941. Why did not you send this?—You might as well ask me why I did not send details of every case.

1942. You

1942. You told the Committee that you knew there would possibly be a special objection raised in regard to Messrs. Cory's Wharf?— Sir J. Bazalgette.  
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*Chairman.*] I do not think you can pursue this.

*Witness.*] I may mention that it was only finished this morning, and I was very much pressed for time

1943. Mr. Greene.] As to the tide boards, you say you would have tide boards for all openings; in respect of which openings do you specify a tide board?—In that wall.

1944. Have you paid any regard to the barge building shed which there is upon that wharf?—I do not exactly know what you refer to.

1945. It is the nearest aperture to No. 75?—I should put in slides there.

1946. Then where is your estimate in respect to that?—I have estimated it as a wall.

1947. Although it is work of an entirely different character?—Yes, I have said that I cannot go into details in my general estimate; that is one of the corrections I should make in carrying it out.

1948. How many moveable slides are there throughout the whole district that you have surveyed?—Do you mean the Lambeth district?

1949. Yes, how many apertures are there to be protected by moveable slides?—Twenty-three.

1950. Can you tell me how many there are along the whole district?—No; it would be a long operation.

1951. Some thousands?—I cannot tell you.

1952. Would you say some thousands?—No, I would not.

1953. Some hundreds?—I daresay some hundreds.

1954. Several hundred?—I cannot tell.

1955. Can you tell me this, would 50,000 £. be raised by a halfpenny rate all over the metropolis?—I cannot tell you off-hand.

Re-examined by Mr. Cripps.

1956. I assume that you agree with the Metropolitan Board of Works that in some way and by some authority these floods must be prevented; that is an imperative necessity?—Undoubtedly.

1957. Is the mode in which you have endeavoured to prevent them as economical a mode as is possible, in your opinion, consistent with its being done effectually?—Yes, I think so.

1958. And you have endeavoured, have you not, to find out how this can be done effectually and as economically as possible?—I have.

1959. Supposing that you had been employed to undertake this matter for any of these district boards, as you have been for the Metropolitan Board of Works, should not you have recommended in each case exactly what you recommend now?—Certainly.

1960. Assuming that there had been no alteration at all in the Act, you would have been limited to no plans whatever; supposing you had been consulted by them last year, you would simply have had to devise such means as might have been effectual for the prevention of this injury?—Yes.

1961. And had you been called in then, your plan would simply have been regulated by what was necessary, and nothing else?—Yes, they would have been of the same character then as now.

1962. And now, from time to time, if this matter is to continue as a protection, that must still be your guide in carrying out any works whatever that are necessary for effectually preventing the floods?—Yes, certainly.

1963. Then what you have suggested in consequence of what was asked for by the Committee is what you think necessary at the present time, assuming that something is to be done immediately?—Yes.

1964. I need scarcely ask you this: no doubt you are familiar with what has been going on in other parts of England; had you been called in to advise any Commissioners of Sewers, your guide would still have been the same, to devise what was effectual for the purpose?—Yes.

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1965. And you would not have been hampered by any plans whatever being submitted to any authority beforehand?—I do not understand your question.

1966. If you had been called in you would have been free to advise such plans as were necessary, without being limited to anything which had been submitted to Parliament in any way whatever?—Yes.

1967. You know that the Commissioners of Sewers have general powers to direct what is necessary?—Yes.

1968. And that was what the separate district boards had power to do under Section 69, assuming no such Act as this had been passed?—Yes.

1969. Supposing this is a necessity, and can only be done in a particular way, and certain works are necessary, some parties may have to be compensated for works which are done for the general benefit?—I apprehend so, under the Act.

1970. That is so, but it would be exactly the same whether the Metropolitan Board of Works, or the vestries, or the districts, undertook the work?—Yes.

1971. If the work must be done, and can only be done by inflicting injury upon an individual, whoever does the work must pay full compensation to the individual?—Yes.

1972. In point of fact, though you have considered that you could not go into the question of compensation, looking at the various special cases that have been put to you, is there any reason to apprehend that the compensation would be very considerable?—My own opinion is that it ought not to be so.

1973. As far as mere claims go, you have experienced that parties at all times make large claims?—Yes.

1974. Which are fairly considered by the tribunals to which they are referred, and only such an amount given as may be fair?—Yes; I can form no opinion as to what amount might be given.

1975. I observe particularly you stated that the works to be done on the south side of the river would be considerably more expensive than on the north side of the river?—Nearly double.

1976. Taking that as a strong point of illustration, would it therefore be fair for the south side of the river to pay double what is paid by the north, or that the rate should be spread over the whole metropolis, it being absolutely impossible to benefit the north by works done on the south?—Clearly.

1977. As to Wandsworth, the question was put to you that the works which you think necessary in Wandsworth parish alone are half as much as the whole works required on the north side of the Thames?—It is so.

1978-80. Therefore, if it were spread over the whole, it would be to make the north of the metropolis pay very largely for the benefit to be derived entirely by the Wandsworth district?—Yes.

1981. You know that by the present Bill the expense to Wandsworth might now, by the machinery of the Bill, be aided in the first place by any contribution from the Metropolitan Board?—Yes, as far as I understand, it is left to the discretion of the Board to determine who shall pay for it.

1982. The Metropolitan Board might now, if they think fit, contribute to that expense?—Yes.

1983. Are you aware that the Metropolitan Board might now, if they think fit, make any other parish, aided by the works of Wandsworth, contribute to the expense of the works at Wandsworth?—Yes; it is left discretionary with them who the burden shall fall upon.

1984. As to the tumble-down wall, a great many questions have been asked about that; I suppose something is necessary to be done to the Fulham wall by some one in order to prevent floods?—Clearly.

1985. And the amount of expense to be incurred in that matter must be the same if the work is to be effectual, whoever pays for it?—No doubt.

1986. You also mentioned that of what you thought would be required to be efficient for the purpose; you found a considerable portion has been done already?—A very large proportion. I think by far the most expensive work has been done by various dock companies and large railway companies upon the banks of the river.

1987. Are

1987. Are the works which you see done, tolerably efficient for the purpose ? *Sir J. Bazalgette.*  
 —Quite. 7 June 1877.
1988. Those works have all been done by individuals ?—Yes.
1989. About what proportion is that ; half ?—I should think as regards works, half has been done, but as regards the cost, the most expensive half has been done.
1990. Your estimate of course does not deal with that, but your estimate deals with only what now remains to be done ?—Yes.
1991. Assuming you had to do any particular work in any dock or any wharf, which might be injurious to the owner of it, would it not be the custom in the first instance to consider with the owner how the work could be done effectually, and at the same time least injuriously to him ?—Yes ; I apprehend the course would be this ; the owner of the wharf would be called upon to raise his wharf, and he would do it in his own way ; if there were any difficulty about it, I should prepare a plan ; if he objected to the plan, I should meet him and see what the objections were, and how the objections could be overcome, and modify the plan to meet his views.
1992. Up to this time, looking to the opportunity you have had of considering the matter, you have not had the opportunity of considering the question with the owners, and suggesting what ought to be done, and considering with them how it should be done ?—No.
1993. But that would be done before the work was actually carried out ?—Before any compulsory work was carried out that would be done.

*Mr. Charles Mills Roche, sworn ; Examined by Mr. Cripps.*

1994. You are a Member of the Metropolitan Board of Works ?—Yes. *Mr. C. M. Roche.*
1995. And I believe you are now Deputy Chairman of the Works and General Purposes Committee ?—Yes.
1996. You were Chairman of the Parliamentary Committee of the Board in former years ?—Yes.
1997. Have you paid considerable attention to the Bill now before this Committee ?—Yes.
1998. The question of the necessity of the Metropolitan Board undertaking some measure for the prevention of floods has been before the Board for some time, I think ?—Yes, ever since November 1875.
1999. And at one time, I believe, you were in hopes of being able to introduce a Bill last Session for that purpose ?—Yes, it was so, but there was not time to do it.
2000. The present Bill, and the principle of the present Bill, has been considerably discussed, has it not, by the Board from time to time ?—Yes.
2001. And the main question that has ever been in doubt at the Board has not been so much the necessity of the works being done, as in what way the incidence of taxation should be made to bear ?—That is so.
2002. Some members of the Board being desirous to throw the expenses over the whole metropolis, and the majority of the Board deciding that it should be borne by the parties interested ?—Yes, that the provisions of the previous Act of Parliament should be extended and amplified.
2003. In the course of that, or independently of that, your attention has been called to the existing state of the law under the 69th section of the Metropolis Local Management Act ?—Yes.
2004. That throws the expense of the prevention of floods not on the Metropolitan Board, but upon the vestries and local boards ?—That is so.
2005. I daresay you are aware that by that scheme by which the Metropolis Local Management Act and the General Board were brought into existence, these district boards were brought into existence also ?—That is so.
2006. And the powers of the Commissioners of Sewers, which had existed up to that time, thereupon ceased, and were vested some in the Metropolitan Board and some in the district boards ?—Yes.

*Mr. Littler* objected to the witness being asked to give an interpretation of an Act of Parliament.



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Mr. Cripps was heard in support of his line of examination.

The *Chairman* stated that Mr. Cripps was entitled to ask the question, but that the Committee could attribute to the answer such importance as they pleased.

2007. Mr. Cripps (to the *Witness*).] You have Section 69 before you?—Yes.

2008. If I am wrong in quoting it, you can be cross-examined as to it; but when the Metropolis Local Management Act was passed, Section 69 in that Act of Parliament is the only section, is it not, except so far as it is followed by others explaining it, which dealt with the mode of protecting a district from floods?—I am not aware of any other section except that.

2009. This section of the Act of Parliament states, “The vestry of every parish mentioned in Schedule (A.) to this Act and the Board of Works for every district mentioned in Schedule (B.) to this Act shall (subject to the powers by this Act vested in the Metropolitan Board of Works) from time to time repair and maintain the sewers under this Act vested in them, or such of them as shall not be discontinued, closed up, or destroyed under the powers herein contained, and shall cause to be made, repaired, and maintained such sewers and works, or such diversions or alterations of sewers and works as may be necessary for effectually draining their parish or district, and shall cause all banks, wharves, docks, or defences abutting on or adjoining any river, stream, canal, pond, or water-course in such parish or district to be raised, strengthened, or altered, or repaired where it may be necessary so to do for effectually draining or protecting from floods or inundation such parish or district;” that was a direct injunction put upon them by this Act?—Yes.

2010. And there is no such duty cast by this Act upon the Metropolitan Board as a Board?—No, it had neither the duty nor the power.

2011. Therefore assuming that no Act of Parliament passed at all now, and no alteration was made, this law would remain, and what is necessary for protecting a district must be done by the district, and at the expense of the district?—Yes, I believe that clause has been found insufficient, and the districts have found it insufficient; they are unable to carry on their works under that clause.

2012. Or at any rate beyond this, that though that clause stands there in the words in which I have read it to the Committee, notwithstanding that floods have taken place and do take place in the metropolis at certain times?—Yes.

2013. Your attention having been called to that, was it your desire on behalf of the Board to amend and improve that Act, so as to make that power more effectual and more practicable than it has been found up to the present time?—The Board came to the deliberate conclusion that it was necessary that something should be done, and they passed a resolution which, perhaps, I had better read: “That so much of the Report as relates to the question of protecting the metropolis from inundations from the overflow of the Thames be approved, and that in the opinion of this Board it is desirable that they should confine themselves to strengthening the powers of vestries and district boards to enable those bodies to carry out the provisions of the 69th and 70th sections of the Metropolis Local Management Act, 1855, and that this Board should have power to intervene, and to require the execution of necessary works.” That motion was put, and there was an amendment to it moved, “That the further embankment of the Thames is a metropolitan matter, and should be paid for out of public funds, either by a further extension of the coal and wine duties, or by a rate levied over the whole of the metropolitan area, and that it be referred back to the Works and General Purposes Committee, with authority to confer with Her Majesty’s Government on the question.” The amendment being put to the vote, there were for it six, and against it 23, and the amendment was lost.

2014. Mr. Pember.] And the original resolution was then passed?—And the original resolution was then passed.

2015. What is the date of that?—7th of April 1876.

2016. Mr. Cripps.] That was when you were thinking of the Bill that you were

were too late for last Session?—No, it was when the debate took place at the Board upon the main question whether it should be a metropolitan rate or whether it should be confined to extending the provisions of the previous Act, and carrying out the principle of that Act.

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2017. It would be leaving the liability and incidence of taxation the same as it was up to that time?—Exactly where that Act put it.

2018. In point of fact, it was the gist of the division, whether the incidence of taxation should remain or whether it should be altered?—It was so.

2019. And that it should remain was carried by the majority that you have just mentioned?—The amendment was lost.

2020. And then the original motion was carried?—The original motion was carried.

2021. That having been so, and as a consequence of that resolution, the Bill has been prepared this year, and is now before the Committee?—Yes.

2022. Will you point out to the Committee the alterations from the existing law which are introduced by the present Bill; perhaps I may call attention to the different points?—You had better do that.

2023. First of all, by the old Act, the Metropolitan Board, as a Board, have no power to interfere in the matter at all?—No, none whatever.

2024. Do you now take power to interfere, so as to set the vestries in motion when you find the necessity for their action?—Yes; Clause No. 5 gives power to the Board to make such orders for the guidance, direction, and control of the vestries and district boards for preventing floodings, as the Board deems fit and desirable.

2025. Those orders being for the guidance, direction, and control of the vestry of any parish or the board of works for the district, with reference to the powers which are already existing under Section 69?—Yes.

2026. Do you take the further power that you may require for the extension of those works according to any special plans or sections which you may think fit to specify?—Yes, there is a general power requiring them to do that in any particular case or parish which the Board may be advised by its engineer would be necessary to be done.

2027. The difference as to that point is, that the initiation of the matter is with you as the Board, or may be with you as the Board, if the district board does not do its work, or you think more work is required to be done?—The Board considered, seeing how inefficient the previous provisions had proved, that it was necessary that there should be some controlling power in the Board to direct the necessary works to be done in accordance with the advice of their engineer; that there should be one general line of level, and that they should advise in all cases, in all parts of the river, what was the proper level, and what were the proper works to be done.

2028. Or if you find any person liable to repair by prescription, upon proving this fact, the district board could, under the Act of 1869, have called upon them to do the works they are liable for?—Yes, there is nothing in this Act to relieve any person who, by tenure, prescription, or otherwise, is now liable to do it. They are still by this Act liable to do it, and abide the directions of the Metropolitan Board, or the vestries.

2029. There is not only nothing to relieve them, but by Section 9 of this Bill the duty is repeated: "Where in any parish or district within the limits of this Act any person or persons is, or are by prescription, or by reason of tenure, or otherwise, liable by law to execute any works, it shall be lawful for the board or vestry of such district, or the board of works for such district, by notice in writing, to require such person or persons, jointly or conjointly, to execute the same"?—Yes, or they may join with such person in doing it.

2030. Or if any person is liable to do some works, but not all the works required for the purpose, then you may call upon that person, and the district who are liable for the remainder, to do the work jointly?—Yes.

2031. Then you take power under Section 12, do you not, to enable parties who are liable, to acquire lands for that purpose?—There is that power.

2032. And to enter upon lands for the purpose of doing the work, if the work requires to be done by entry upon somebody else's property?—Yes, that is so.

2033. Do you know that that is one of the matters which has been put forward

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forward as creating a difficulty in the working of the Act up to this time; that there was not sufficient power of entering upon property for the purpose of doing the work required?—I believe that has been one of the main causes which have prevented the vestries and district boards from carrying out the provisions of the Act of 1865.

2034. And that is proposed to be remedied by that Section 12?—It is so. I believe the vestries were so advised by Counsel.

2035. Under the old Act, the existing Act, are you aware that there was no power in one district board if it did a work which might be for the benefit of itself and some other district board, to call upon that district board to contribute to the work?—That is so.

2036. How does the Metropolitan Board take power to call not only upon one particular district, but upon any particular number of districts interested in the work, to do the work according to the interest they may have in the work being done?—It enables the Metropolitan Board to call upon two or more parishes to do the work, and gives them power of apportioning the costs thereof equitably.

2037. The exact amount of contributions would have to be apportioned by the Board?—Yes.

2038. Further than that, do you also take new power to contribute from the general fund of the Board to any of these expenses which may be required locally for the purpose of protecting the property from floods?—Yes.

2039. Up to the present time, there would have been no such power to contribute?—No.

2040. Even if you thought in this particular case it was fair that the Metropolitan Board of Works should bear any portion of the burden, you have no power of contributing to it?—I think not; I believe we have power to contribute for various matters, but I believe it does not include floodings.

2041. At all events, you have now taken the power to render it beyond all question and dispute?—Yes.

2042. So far as the parishes are concerned, this is a clause to relieve them from the liability they otherwise would have, by anything the Metropolitan Board of Works may think fit to contribute towards the expense?—Yes.

2043. And in the same way it is a relief to any particular district, who, being a riverside district, would have to do particular works, that through the machinery of the Board other districts can be called upon to aid them in doing the works, if the other districts are benefited?—That is so.

2044. In other respects but those which I have mentioned, does the Bill leave the liability just as it is at the present time?—I believe so; it was intended to do it.

2045. And in that respect, excepting so far as the contribution by the Board is concerned, the incidence of taxation is not changed by the present Bill?—No; it carries out the policy of the Act of 1855.

2046. As a member of the Metropolitan Board, have you had frequently to consider the question of what are properly metropolitan improvements attributable to the whole of the metropolis, and what are not so but mere local improvements?—Yes.

2047. And there are some which one may call to some extent of a mixed character?—Yes.

2048. Where you are in the habit of contributing something from the Board towards the local expenses?—Yes, that is so.

2049. Now as the guiding matter directing the Board generally upon that subject, as to what is metropolitan, do you look essentially to the matters by which all the inhabitants of the metropolis may be benefited?—Yes.

2050. For instance, in your Street Improvement Act, which you have this year, and have had in former years, is the general question which you keep in view as to what is metropolitan, the question of what is a thoroughfare and what are the great leading thoroughfares?—Yes, no doubt of it; and what will facilitate the traffic in the metropolis, by opening up new leading thoroughfares.

2051. That is what are great thoroughfares in which all persons passing through the metropolis may be interested?—Yes.

2052. On the other hand, if you find a matter which cannot be dealt with in that

that way, in which only certain persons can be interested, that you do not deal with as metropolitan?—No. *Mr. C. M. Roche.*

2053. But you leave it to the local authorities?—Yes, the local authorities do it, and we contribute towards it. *7 June 1877.*

2054. That being your principle, let me ask you, with regard to the scheme or proposal now before the Committee, is there anything according to the principles upon which you have acted, which would make this metropolitan in its nature, or is it not rather a matter interesting the parties who would be injured by the flooding if it takes place?—It does not appear to me to be in any sense a metropolitan matter. The previous Act of Parliament of 1855 threw it upon the vestries and district boards, as a local matter.

2055. In the first place, the river divides the metropolis into two, though two unequal parts?—Yes.

2056. Floods on one side of the river can scarcely be said to be a matter of concern to the other bank of the river?—No, certainly not.

2057. And you know that under the Commissioners of Sewers of course the other bank of the river, like other property, would have had nothing to do with contributing to the expense?—No; there are different Commissions of Sewers.

2058. There were different Commissions of Sewers for the different sides?—Yes; there would be one on the Essex side. The Metropolitan Commissioners of Sewers' jurisdiction extended upon both sides, but that was before my time.

2059. As to the general rates of the metropolis and the general taxation of the metropolis, do you think that it would be quite sufficient for them or more than sufficient if there were the right of exercising the discretion in particular cases to contribute from the general funds to particular improvements?—Yes, I think so, and that is the opinion of a very large majority of our Board.

2060. When you say the opinion of a large majority of the Board, do you mean after having discussed this particular matter?—Yes, it was discussed very often.

2061. I think you have prepared yourself, if necessary, to enumerate to the Committee a great number of cases of Commissions of Sewers all of which proceed upon one principle, a contribution from those who are benefited by the expense?—Yes; the entire law of sewers has been that the area benefited by the works is the area to be taxed; that is the principle of every Commission of Sewers.

2062. And you might give the Committee something like 50 or 100 cases?—Yes, you will find this in the Local Taxation Returns, and at page 117 you will find a large number of Commissions of Sewers at present in existence.

2063. Let me ask you this one question: if the cost of this were to be put over the whole of the metropolis, in your opinion would it be an entire alteration of the principle of the law which has existed up to this time?—Yes, I think it would.

#### Cross-examined by Mr. Richards.

2064. On behalf of the Conservators of the River Thames, let me call attention to what Sir Joseph Bazalgette said at Question 132. "I understand you to say, as I understand my learned friend to say that it is not your intention in any way or kind to derogate from the rights of the Thames Conservators, in reference to the bed, soil, and shores of the Thames which are secured to them under the Act of 1857? (A.) I believe not;" do you confirm that; is it or is it not your intention in any way to affect the statutory rights of the Thames Conservancy as to the bed, soil, and shores of the River Thames as secured to them under the Act of 1857?—No, not further than may be necessary to give effect to the Bill.

2065. What I want to know is, do you intend in any way to interfere with their position as established by the Act of 1857?—What do you mean by "their position?"

2066. The rights vested in the Conservators by the Act of 1857?—

*Mr. Cripps.]* These are the identical clauses put in for your protection in other Acts.

*Witness.]* If there is any clause which you want, if you think the clause is not sufficient here, if you would submit it to the Board it would receive the greatest consideration.

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2067. Mr. *Richards*.] Before we submit the clause, let me read the Thames Conservancy Act of 1857, section 50: "All the estate, right, title, and interest of the mayor, commonalty, and citizens of the City of London, in the bed and soil and shores of the River Thames, from Staines, in the county of Middlesex, to Yantlett, in the county of Kent, and all the estate, right, title, and interest to which Her Majesty was on the 23rd day of February 1857 entitled, in right of Her Crown of, in, and to the bed, and soil, and shores of the River Thames, within the flux and reflux of the tides, bounded eastward by an imaginary line to be drawn from the entrance of Yantlett Creek, in the county of Kent, on the southern shore of the said river to the City Stone opposite to Canvey Island, in the county of Essex, on the northern shore of the said river, and of, in, and to all encroachments, embankments, and inclosures therefrom or thereupon, except such parts thereof as are hereinafter specified, shall from and after the commencement of this Act be, and the same are hereby vested in the Conservators;" is it your intention in any way to affect their statutory rights?—Not the least in the world.

2068. There is no mistake about it?—No, none. "Nothing in this Act contained shall extend or be construed to extend to prejudice, or derogate from the rights of the Conservators of the River Thames, or to prohibit, defeat, alter, or diminish any power, authority, or jurisdiction which at the time of the passing of this Act the said Conservators did or might lawfully claim, use, or exercise, so far as such rights, power, authority, or jurisdiction may be exercised for the preserving of the free navigation of the River Thames."

2069. Should you be prepared to take that clause, and strike out the words from "so far" down to the end of the clause?—

Mr. *Cripps*.] Perhaps you will put the clause before us. It must be a matter to be thoroughly considered.

2070. Mr. *Richards*.] If you will read Clause 25 I will call attention to the words beginning "so far;" do not they expressly limit the title and estate of the Thames Conservancy, and limit its application so far as it concerns the navigation of the River Thames?—That is a matter of construction.

2071. Is it not clearly a limitation from the words "so far"?—Yes; we are not in any way to interfere, so far as preserving the navigation of the River Thames is concerned.

2072. They are words of limitation as they stand there?—They appear to be so.

2073. It is not your intention in any way to limit the power, and right, and estate of the Thames Conservancy Commissioners?—No, but I apprehend if it is necessary to take a small piece of the river for the purpose of carrying a wall along it, and to prevent inundations, there is power in the Bill to obtain it from the Conservators, and power to them to give it to us is necessary.

2074. Giving is a voluntary act?—There must be power for us to take it if we want it.

2075. Then you do not propose to interfere with the title and estate of the Conservators?—I understand this, that supposing it is necessary to take a yard or two or three yards of the bed of the river, we shall do so.

2076. Or two or three miles?—No, it is not two or three miles; for that purpose there must be power to take it.

2077. Then you do intend, if necessary, and it suits your purpose, to override the estate and rights of the Thames Conservancy Commissioners?—I do not know whether that is overriding them.

2078. You propose to take part of their estate?—In Clause 14 it says so, I believe.

2079. I will read Clause 14; that is limited in exactly the same way; the very first words are, "In order to preserve the navigation of the River Thames, the plans of any works to be constructed under the authority of this Act, through, along, over, or under the bed, or soil, or banks or shores of the River Thames, which may interfere with the free navigation of the said river, shall be approved by the Conservators of the River Thames, in writing signed by their secretary, before such works are commenced, certifying that the works according to such plans will not interfere with the navigation of the River Thames." That is limited entirely to works which interfere with the navigation of the River Thames?—That is so.

2080. Then

2080. Then any interference with the banks which did not constitute an interference with the navigation of the River Thames, would not come within that Clause 14?—No, I do not think it would. Mr. C. M. Roche.  
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2081. Obviously it would not?—Do you want a clause to that effect? Why not tell us what you want; you are a public body.

2082. I have had two different answers; Sir Joseph Bazalgette, and Mr. Cripps in his opening, stated that it was not your intention to interfere in any way with the Thames Conservancy Commissioners; now by your interpretation of the clauses it is an interference.

Mr. Cripps.] If you give me the clauses I do not think we should differ about them, though I should say this more than protects you.

Mr. Richards.] Are you prepared to strike out the words at the end of Clause 25?

Mr. Cripps.] I am not prepared to do so. Do you propose the clause without those words?

Mr. Richards.] It will substantially come to that.

Witness.] If the Conservators will state what they want, the Metropolitan Board will meet them in the spirit in which they do all public bodies.

Cross-examined by Mr. Littler.

2083. You told us that, on the 7th of April 1876, there were six for the amendment, and 23 against it?—Yes.

2084. That was not the condition of things at the special meeting of the 1st of December 1876, was it, when there was a resolution by one of the Members for Lambeth, whose parish I represent, that the resolution should be rescinded?—No.

2085. Upon that occasion, the whole subject was discussed on a resolution to rescind the resolution of April?—No, to rescind the resolution of the 6th of October.

2086. Now go to the 6th of October; what was the resolution then, and what were the numbers?—"The Board, pursuant to their resolution of Friday last (No. 6), proceeded to consider the draft Bill in relation to the prevention of inundations from the River Thames, submitted by the Parliamentary Committee, and adjourned on 26th May last (No. 7). The clerk presented a copy of the draft Bill, and reported that, pursuant to the resolution of the Board of the 26th May last (No. 7), a copy had been sent to each member of the Board. It was moved by Mr. Roche, and seconded by Mr. Richardson, 'That the preamble of the Bill be approved.' Amendment thereon was moved by Mr. Fowler, and seconded by Mr. Tolhurst, That the Bill be referred to the Works and General Purposes Committee for consideration and report. The amendment having been put to the vote, there were for it, 11, against it, 20." Then the original motion was put, when there were for it, 21, and against it, nine, and it was declared by the chairman to be carried, and it was resolved that the preamble of the Bill be approved.

2087. On the 1st of December there was a resolution that that resolution which you have just read should be rescinded?—Yes.

2088. What was the result of the voting then?—On the 1st of December, "It was moved by Mr. Fowler, pursuant to notice, and seconded by Mr. Lammin, that the resolution of the Board of the 6th of October last, (No. 31), approving the clauses of the Thames Inundation Bill, be rescinded. The motion having been put to the vote, there were, for it, 15, against it, 20; and it was declared by the chairman to be lost. A division having been demanded and granted, the names of members voting were taken down, when they were, for the motion, 15, against the motion, 20."

2089. That is out of a total number of 45 upon your Board?—There were 35 present.

Mr. Cripps.] As you have read that, it gives a wrong impression; the motion where the large majority was, was when the preamble of the Bill was approved; the second one you have got is, only that the clauses of the Bill be approved.

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2090. Mr. *Little*.] The resolution of the 1st of December was to rescind the resolution approving the preamble of the Bill?—No, it was not so. “It was moved by Mr. Fowler that the resolution of the Board of the 6th of October last approving the clauses of the Thames Inundation Bill be rescinded.”

2091. Mr. *Cripps*.] There is one division upon the preamble; then there was a further division?—Then that the several clauses of the Bill be approved; that motion being put, there were for it 12, and against it six.

2092. Mr. *Little*.] What do the clauses do but carry out the preamble?—They carry out the preamble.

2093. Under those circumstances might not we be saved that special demurrer?—No, because those moving the resolution for their own purposes skilfully moved it as applying only to clauses and not the preamble; they agree to the preamble and not the clauses.

2094. Being a question of taxation, and the preamble being that it is desirable to prevent floods?—They wanted to get as many votes as they could, and instead of putting the question upon the preamble, where they knew they would lose votes, they put the resolution in as regards the clauses.

2095. What was in the clauses and not in the preamble that they could get more votes on?—It was so indeed.



*Friday, 8th June 1877.*

MEMBERS PRESENT:

Mr. Ashley.  
Mr. Grant Duff.  
Sir George Elliot.  
Mr. Gordon.  
Sir James M'Garel-Hogg.

Mr. Locke.  
Sir Andrew Lusk.  
Mr. Mark Stewart.  
Mr. Watney.  
Mr. Wilson.

MOUNTSTUART E. GRANT DUFF, Esq., IN THE CHAIR.

Mr. *Charles Mills Roche*, re-called ; and further Examined by Mr. *Littler*.

2096. YESTERDAY there was a question asked as to whether this was a division on the clauses or on the preamble, but I presume you are aware that the main objection made by those of the river side parishes who object, is to the way in which that preamble is carried out?—No, I do not understand that at all ; I understand them to object to the preamble.

2097. The main objection ; I do not say the whole objection?—I understand the main objection is to the preamble itself.

2098. And you think the object of dividing as to the clauses, was to get more votes?—It did get more votes.

2099. But why?—Because some member said they were in favour of the preamble, but they had no objection to reconsider the clauses.

2100. But those clauses were the clauses to carry out the preamble?—No doubt of it.

2101. And if the clauses had been reconsidered, the preamble would have had to be amended?—No, that does not follow.

2102. But I say if they had altered the clauses in the sense in which it was desired to alter them?—You would not have altered the clauses while the preamble remained.

2103. Could not you?—No ; because the preamble says it is to extend the provisions ; and they wanted to alter the principle entirely upon which the previous Act was passed.

2104. Was it pointed out that there was an inconsistency in attempting to alter the clauses?—Yes, and a very long debate.

2105. The end of it was that the voting, which originally had been 23 to 6, and then in the next instance 11 to 6, was 15 to 20, was it not?—Yes.

2106. Has it been before the Board since then ; has there been any subsequent division taken, or was that the last?—I have no note of any subsequent division.

2107. Was not that the ground on which it was desired to alter the clauses, the objection to the incidence of taxation ; was not that the question upon which the division took place?—No.

2108. What was it on?—On the question of referring the whole of the clauses back for further consideration.

2109. The whole clauses?—The whole thing.

2110. You say that that was the matter discussed upon that occasion when the division took place?—Yes, whether they should be reconsidered.

2111. Is it not the fact that in the discussion one of the main things discussed was the incidence of taxation?—No doubt that was so.

2112. You said to my learned friend, Mr. Cripps, that it was considered as long ago as 1875, and has been under consideration ever since ; I presume I

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**Mr. C. M. Roche.** may assume that this is a well-considered measure?—It has been discussed at the Board and in the Committee very fully.

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2113. You have had a good deal to do with those questions; have you ever before promoted a Bill in which you did not consider the question and get a report to the Board what the cost of the compensation would be, for your own guidance, not for general publication?—I cannot answer that question.

2114. Have you ever, so far as you know, in any case in which you have had anything to do, done so?—Yes, the Main Drainage Act; the whole of the main drainage was carried out without any detailed estimate of compensation.

2115. I do not ask about detailed estimate?—Or any estimate; there was no estimate in that case.

2116. Do you present to the Committee the main drainage as being a thing in which there was the same class of interference with individual private property, as by this Bill?—It is very similar; we interfered very largely with private property in passing through it, and under it, and shutting up the public streets.

2117. Shutting up the public streets is no subject of compensation?—I am afraid that you will find that there have been some cases lately.

2118. I was not aware that you were a lawyer till yesterday?—We shut up one or two streets, and you will find that the contractor, who carried out the work, had to pay very large sums for compensation.

2119. The contractor?—Yes, we threw it upon the contractor.

2120. You must have had some estimate of the cost, what it was likely to cost?—Only a general estimate; no such estimate as the engineer may have given in this case.

2121. There is here no general estimate of the cost of compensation?—No, not the compensation; the cost of works.

2122. Do you mean to say; that the contractor took upon himself all cost of compensation without there having been any estimate whatever made of what it was to cost?—Yes.

2123. You say so seriously?—Yes.

2124. As you have mentioned the main drainage, I will ask you this: you said that the north and south of the Thames were considerably separated; the main drainage of the north and south of the Thames are entirely separate systems, are they not?—No, it is one system, one principle and system applied to both sides of the metropolis.

2125. You know what I mean by a system of sewers?—There is the same systems upon the north as upon the south side; the pumping stations are the same upon the north as upon the south.

2126. Take the high-level system of sewers on the north side, it does not benefit the low-lying level, nor the low-lying level the higher?—The high-level sewer very materially benefits all the low-level, because it prevents the water getting down to the low level.

2127. It takes off the storm water, but it does not accommodate the houses lying on the low level?—No, but it relieves the whole of the lower level of the mass of water that would flow into it.

2128. Do the sewers of the south join those of the north?—No.

2129. Did you make a separate taxation of the south from the north?—No, there was one general system of taxation throughout the whole of the metropolis, the whole of the metropolis having an equal benefit from the drainage of the metropolis.

2130. And the whole of the metropolis lying on the Thames having the advantage of all the embanking on the Thames, is not that so?—I do not understand the question.

2131. Do you not; then I am afraid I cannot make you?—I do not understand it.

2132. Then perhaps the Committee do, which is more important; can you say in any way that there would have been any difficulty in carrying out the southern drainage scheme without carrying out the northern?—The southern drainage could have been carried out, I apprehend, apart from the northern, if it was so desired.

2133. But you did not think it right to levy a separate rate on the southern part of the metropolis?—It was done by one rate over the metropolis, all parts of the metropolis being benefited by the works; the south having the benefit  
and

and the north having the benefit. In the case to which we are now referring the benefit will be confined to the various districts on the river.

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2134. So far as the Victoria Embankment has kept the floods out of Westminster, who got the benefit of that, the south or the north?—If it has kept any floods out of Westminster, Westminster has got the benefit.

2135. But the floods cannot get into that part of Westminster where there is a bank; your Counsel read the report of a meeting of the Council of 1821, where they were called together hastily in the evening to keep the floods out of Westminster?—How many years ago was that?

2136. Your Counsel told you; when was it; you know, do not you?—I do not know indeed.

2137. You have not read Mr. Cripps' speech?—No.

2138. It was 1821?—That embankment was not made for the purpose of protecting any part of London from floods.

2139. I do not say it was, but has it not had the effect of protecting the portion lying behind from the floods?—I cannot say that it has. I do not know it as a matter of fact.

2140. You know Westminster is not flooded now, although the tides are higher?—I do not know whether it is flooded or not.

2141. Do you know that the floods are higher than they used to be?—Yes.

2142. And you surely know that Westminster is not flooded now?—No, I do not.

2143. Do not you know it?—No; I do not know how far Westminster extends; there may be some parts flooded.

2144. It is sufficient for my purpose, if you choose to give such an answer as that; have you studied, when you came to the decision to support this Bill, Sir Joseph Bazalgette's Report of the 20th of March 1876, which has been referred to already?—Yes, it was presented to the Committee before they determined upon the resolution which has been read.

2145. At paragraph 2 of Sir Joseph Bazalgette's Report, he says, "But even under this arrangement very extensive alterations would have to be made to wharf and private property, and the claims for injuriously affecting them would be very heavy, and it would be scarcely possible to form any estimate of these items beforehand;" was not it worth while to take some trouble to try and ascertain that?—No; the Committee accepted that report, and acted upon it.

2146. And you do not much care what the districts have to pay for compensation?—Yes, indeed we do.

2147. Would not it be well that this Committee should know what we are likely to have to pay for compensation, before declaring that we shall do the works?—We are informed by Sir Joseph Bazalgette that there would be the greatest possible difficulty, until we came to put the works into execution, in ascertaining what compensation would be required.

2148. That you have said; I suppose you accepted the other statement that he makes: "The owners or occupiers would in that event find means to carry on their business, without such extensive alterations of their property as they would expect if the work were done out of public expenditure, and the claims for compensation would not arise;" it is Sub-section 3, close after what I have been reading to you?—You must read it in connection with 3, above.

2149. And I will read what follows too?—He is not referring to what he suggested in No. 2, but what is suggested in No. 3.

2150. "Since the Board have completed the survey and levels along the fore-shore of the river, we know that about 30 of the owners of property have raised or are now raising their banks as shown on accompanying list; probably more have done so, or would do so without hesitation if required by some recognised authority. The work done under this arrangement would be generally of the character of that described under Heading 2, but the owners or occupiers would in that event find means to carry on their business?"—That is when we were to ask them to do it without any further power.

2151. But you anticipate that if the work is done out of public expenditure, they will ask for compensation?—That is what Sir Joseph considers.

2152. And what you accept?—And what we find generally to be the case.

2153. And you anticipate now that either you or the districts may be involved in compensation for every one of these cases?—No, not in every one of the

Mr. C. M. Roche. cases ; there may be and will be some cases in which compensation will have to be paid.

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2154. But whether it is little or much, you cannot tell?—No.

2155. You have not the slightest notion?—I cannot say that I have not the slightest notion.

2156. How do you propose that those entitled to compensation are to be paid?—The Bill provides that the compensation would have to be paid in the same way as the cost of executing the works would have to be paid by this Bill, by the vestry or district board in the locality in which it was done ; and it is upon this main principle that the benefit to be derived from the raising the banks is a benefit to a particular district and is not a benefit to the metropolis at large ; that is the principle.

2157. Then you might order a work which might cost 2,000*l.*, and the compensation, for anything you know, might be 200,000*l.*, and the vestry might be compelled to pay it?—No, that is not at all probable.

2158. Never mind about it being probable ; is not it what might happen under your Bill?—No, I do not think it might happen or could happen that any such amount of compensation could be claimed under the Bill.

2159. You would have power to order the works and compel us to carry them out, and we should have to pay the compensation unless you chose to contribute?—Yes.

2160. Which is entirely within your own option?—It is entirely in our option. We have power to give directions to vestries and district boards, but if I may be permitted to say so, from my knowledge of the way in which the Metropolitan Board of Works do their work, supposing this Bill becomes law, they would prepare, without reference to any parish, a scheme that would be submitted to the local or district authority ; there would be conferences upon it, and an endeavour to be perfectly in accord as to what was right to be done, and we should leave the parish to carry it out in the way agreed upon.

2161. Do you know of any instance, any in this country, where one public body has the power to do the work and another has to pay the compensation?—I think we have power with reference to sewers. If a vestry comes to us and wants to make a sewer, they might say that they wanted only a two-foot sewer ; we have perfect power to say, we shall require you to put in a sewer five feet high instead of two feet, and they must pay the expense of it.

2162. That is for the work?—For the work and any compensation ; if they have to go over land they must pay compensation.

2163. But they have the power then to decline to make the sewer at all?—I do not think so. I will not be sure about that.

2164. Can you compel them?—Yes.

2165. Will you give me the authority?—I think we can compel them ; we never do it.

2166. You never have done it?—No.

2167. You can give it me presently. Now let me ask you this : you gave an illustration to my learned friend yesterday of the metropolitan improvements and streets required for the whole metropolis ; in those instances the streets are of advantage to the particular parts that they go through?—Yes.

2168. Do you make any difference in the rate, or rate it over the entire metropolis?—No, that is rated over the entire metropolis, because different parts of the metropolis have streets made in them for the public convenience, and that is a metropolitan matter, the same as the parks.

2169. But the district is benefited?—The district may be benefited, but in some instances the districts say they lose by it.

2170. But, as a rule, they get a benefit, do not they?—I do not know that they do ; the public get a much greater benefit than the district by the traffic being facilitated, which is of infinitely greater use to the public than to the mere district ; the district gets no absolute benefit from having a wide thoroughfare through it, but it is a benefit to the metropolis to have wide large streets, through which the traffic can flow quickly.

2171. How is it that you find a district making a wider thoroughfare at its own expense?—To facilitate the traffic is not a benefit to the district, but the districts do very little in the widening of streets.

2172. But

2172. But they do widen streets, because you over and over again contribute to widening?—Yes.

2173. The next paragraph is this: "There would still remain some public roads, draw docks, creeks, and rivers, where public works would have to be executed; but these, so far as we can at present judge, ought not, in such event, to exceed 100,000 *l.*"; did you require any estimates of this from Sir Joseph Bazalgette?—No.

2174. Do you know whether they are included in the present Bill at all?—Sir Joseph has stated that in his evidence.

2175. I want to know whether you had an estimate of the 100,000 *l.*?—No, we had no estimate of it.

2176. I have drawn your attention to the way in which it is repeated again: "After the general principle upon which the river is to be embanked, or the present banks raised, has been determined, it would necessarily occupy some considerable time to determine the character, form, designs, and estimate the cost of the works involved, which would be exceedingly varied; many of these could only be ascertained in conference with the owners and occupiers of the premises, and after obtaining a clear understanding of the mode of carrying on their business and the wants arising therefrom"?—Yes.

2177. Who is to decide it; you, or the parishes, or Sir Joseph Bazalgette, or who?—As I say, I have no doubt that the practical working would be this: Sir Joseph would say what he thought right for the purpose of advising the parishes; it would be sent to them; they would consider it and confer with the Board, and they would be left to carry it out.

2178. "It would, in my opinion, be impossible to form any estimate of the amount of the claims which might be sustained under the heading of injuriously affecting. These would have, in a large number of cases, to be settled by arbitration, or in a court of law"?—Yes.

2179. You know that that is a pretty extensive business, is it not?—Sometimes.

2180. Generally, I am afraid, is it not?—Sometimes it is, there is no doubt.

2181. On whom would the cost fall?—The cost would fall upon the district, but the district alone would benefit.

2182. That you have repeated?—I must repeat it because it is the main principle.

2183. You had also before you a report from your solicitors upon the same subject, of the same date?—Yes.

2184. I believe that also was, that "It is not possible to say what extent of compensation the Board might have to pay, or what liabilities would arise if the Act passed on the present principle of the law, viz., of the vestries doing the works in their district; but as a rule I think it would be certain that if the private properties of persons were affected by works, they would claim compensation and succeed in getting it, unless the Act made provision for their not being entitled to it, in case of their neglect or default, or unless some rule were clearly laid down as to the cases where the parties were or not to be made liable, or be exempted wholly or in part, or were declared to be disentitled to compensation"?—Yes.

2185. Have you any clauses in your Bill disentitling anybody to compensation?—No.

2186. You would not venture to put such a thing into a Bill now?—Certainly not.

2187. Here again is another resolution on the next page: "Then upon the second point, viz., as to the liability of the Board to compensation or other claims; if the Board propose, under an Act of Parliament, to execute the works of making and maintaining walls and defences against inundation, and to throw the cost, not on localities, but on the metropolis generally, I think it is a matter requiring great consideration, and one which might necessarily involve questions of liability for claims and compensations, what evidence or reasons Parliament would require to induce their passing an Act with reference to the second point under consideration. That very clear grounds and evidence will be requisite, I think, must be assumed; but Parliament might be of opinion that the principle of taxing the metropolis as a whole, having been applied to many subjects of late, could properly be extended to this subject"?—You may as well read the next paragraph.

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2188. "From the time of Edward the 6th, all the statute law has proceeded on the principle that, as regards defences against the sea and the rivers, works shall be done by the level which would receive benefit or avoid hurt by the works, and taxation was to be made on such levels. Under every Commission of Sewers this language was in substance used, and there are many Commissions in force under such language, and in all of them, as a rule, power is contained for the Commissioners to distribute the burden fairly; and up to the time of the passing of the Metropolitan Sewers Acts, the metropolis was subject to such Commissions, with amendments and powers conferred by statutes as to other subjects; and when the Metropolitan Board of Works was constituted, the 69th and 70th sections of the Metropolitan Management Act, 1855, were introduced into it, taking for guide (as far as they have dealt with that subject) this principle; and, therefore, any law to throw the whole cost on the metropolis would be so far a repeal of the existing statutes, and not be in accordance with the provisions of the existing laws; and therefore as regards the question on which I was directed to report, viz., as to compensation payable by the Board, I think it will be a material feature for consideration as to any Bill, whether the future burden should be placed on areas near the river, or places where inundations could reach them, or whether an area, and if so, what area should be selected for taxation for defence walls and works, either corresponding with the Board's present area, or some other to be substituted expressly as to defence works, or generally on the whole metropolis as now bounded. If any such general area were approved by Parliament, on the ground that the right principle is that of a metropolitan tax, it would seem to be quite within every principle of Parliamentary rule and practice to suppose that Parliament would introduce into the Bill clauses similar in effect to the Lands Clauses Consolidated Act, so as to entitle owners of property to compensation where they may be affected by works done for the general benefit of the area; in fact, taking the words of the directions to me, I think that the contingent liabilities in such case would be much like those of the principle of the General Improvement Acts of Parliament, for I think year by year the tendency of legislation is to provide that public improvements cannot be carried out without regarding the losses which such improvements may occasion to individuals, varied probably by any special circumstances." That is the one you desired me to read?

—Yes, that was the report of the solicitor.

2189. I suppose you are aware that in the old Sewers Act there was an express provision with regard to tidal rivers?—To what Sewers Act do you refer?

2190. The General Sewers Act of 1833?—I will call your attention to Clauses 10 and 19. It is the 3 & 4 of Will. 4, c. 22. It is the General Act relating to Sewers. There was an express provision, was there not, that a jury should be empanelled to inquire into the presentments of the Commission?—I have not the Act before me.

2191. Now I must draw your attention to this part of it; do you know that in that Act tidal rivers are expressly mentioned. You say you are simply extending the principle of 1855, and this was an Act in force in London till the 1855 Act came in.

**Mr. O'Hara.]** The 10 & 11 Vict. superseded that Act altogether.

**Witness.]** There were seven special Commissions of Sewers in the metropolitan district.

**Mr. Littler.]** Will you just listen to this, because I will show you the distinction between the old Act and the existing legislation; unless my learned friend Mr. O'Hara can say this has been re-enacted, you will find the difference. This is Section 10: "And whereas doubts have arisen as to the extent of the jurisdiction of Commissioners of Sewers, be it therefore further enacted and declared, that all walls, banks, culverts and other defences whatsoever, whether natural or artificial, situate or being by the coasts of the sea, and all rivers, streams, sewers and watercourses which now are or hereafter shall or may be navigable, or in which the tide now does or hereafter shall, or may ebb and flow, or which now do, or hereafter shall or may directly, or indirectly, communicate with any such navigable or tide river, stream or sewer, and all walls, banks, culverts, bridges, dams, floodgates,

floodgates, and other works erected or to be erected in, upon, over, or adjoining to any such rivers, streams, sewers or watercourses, shall be from henceforth to all intents, constructions, and purposes within and subject to the jurisdiction of Commissioners of Sewers."

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Mr. O'Hara.] My learned friend is quoting from the Act of 3 & 4 Will. 4, c. 22. The 10 & 11 Vict. c. 70, was passed, which was an Act to explain and amend that Act, and that Act incorporated certain portions of the 3 & 4 Will. 4, but did not incorporate Clause 10. That was the Act of 1847.

2192. Mr. Littler.] What part of the parish of Lambeth is either in the City of London or the county of Middlesex. The Act under which Lambeth was, was the 3 & 4 Will. 4, and there was an express provision as to tidal rivers; will you give it me?—I do not think you are right there.

2193. What word is there in your Act of 1855 about tidal rivers, either in Clause 69 or Clause 70. The old Act having expressly included tidal rivers, does not your Act, by the fact of omission, exclude them?—No.

2194. There again I shall ask honourable Members to judge for themselves?—The major part of the parishes have acted under that section, and have kept their walls and banks in repair.

2195. Has there been any decision that they are bound to do so?—No; I suppose they thought it so plain and intelligible that they never doubted it.

2196. As it is so plain and intelligible, show me, in Clause 69 or Clause 70, where are the words "tidal river," or street or sewer communicating with tidal rivers, or anything of the kind?—The words inserted in Section 69 are so plain to my mind that it was not necessary to insert the words "tidal rivers" at all; "river" is inserted there, applying to all rivers.

2197. Why do not you make the vestries put that section in force?—Because we have no power to do it; and that has been one of the main defects of the Act, that the vestries themselves had not the power of entry upon the lands of owners to compel them to do it; neither have we any power, even if a vestry would not do what they ought to do on their own property, to compel them to do so. I think you will find that you come in under the Westminster Commissioners of Sewers.

2198. You think Lambeth came under the Westminster Commissioners of Sewers; you said that vestries had no power to do it, and you have no power to make them?—No; what I state is this: the vestries have, some of them, stated that they have been advised that they had no power of entry upon private property to compel the owner to do it, nor have they any power of entry to do it themselves and charge the owner.

2199. Because it is on a tidal river?—Not the least.

2200. If it is not on a tidal river we have not the power; will you read Clause 69?—The vestry "shall cause to be made, repaired, and maintained such sewers and works, or such diversions or alterations of sewers and works as may be necessary for effectually draining their parish or district, and shall cause all banks, wharves, docks or defences abutting on or adjoining any river, stream, canal, pond, or watercourse in such parish or district to be raised, strengthened, or altered or repaired." The vestries said they had taken advice of counsel, and although they might have power to do anything where the owner would permit them to go on, under that clause they could not enter upon property.

2201. What vestry has ever told you that?—We were told so by the vestry of Lambeth.

2202. As I represent them, I may ask was not the ground they took that this enactment did not apply to the Thames; as you have come to my people, I may challenge you as to that; was not it their express reason that this enactment did not apply to the Thames?—I never understood that.

2203. Will you say that it is not so?—I understood they were willing to put it in force if they had only the power of entry; so they represented to us.

2204. Let us see whether they have not the power of entry: "And it shall be lawful for any such vestry or district board to carry out such sewers or works through, across, or under any turnpike road, or any street, or place laid out as, or intended for, a street, or through or under any cellar or vault which may be under the pavement or carriageway of any street, and into, through, or



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2205. Does not that give the power of entry upon lands?—They were advised not; that is what we have always been told; we have invariably been told that by various vestries and district boards.

2206. Have you ever been advised not; have you taken opinion of counsel as to the meaning of that Act?—We have no power.

2207. No power of taking opinion of counsel?—I did not say that; no power to compel them.

2208. You are the supervisors of these vestries, are you not?—No; they are thoroughly independent of us.

2209. Did not you try whether they were right or wrong in what they said?—No, they told us they had not the power.

2210. You never asked?—I should think, in all probability, the solicitor has advised us; but I know there is one general impression at the Board that there is not the power, and never was the power.

2211. This is the power: "To enter upon any lands whatsoever, making compensation therefor." What does that mean?—I cannot tell you what it means. I can only tell you the fact that the parties have not put it into execution, and they have been advised not to do so.

2212. Has it not been upon the express ground that the Thames being a tidal river was not included in those words?—It has not.

2213. Do you undertake to say that as regards Lambeth?—I will undertake to say that I never heard it as regards Lambeth. I have heard it said that the Thames is not a river within the meaning of the 69th Section. Although this states that they shall cause the banks adjoining any river to be raised, they say that the Thames was not included.

2214. That is a contention; as you think that that is so, what is the meaning of "entering upon any lands"?—It was intended, I suppose, to enable the parties—

2215. That enables the district board, or the vestry or district board, to enter upon any lands whatsoever, making compensation therefor, and to construct works upon any land whatsoever?—"Any such sewers or works through, across, or under any turnpike road;" they can only make it through or under; they cannot take absolute possession of the land under it.

2216. "Into, through, or under any lands whatsoever?"—Whatever may be the meaning of the clause, we have always been informed that the parties have been advised not to attempt to put it into operation.

2217. That is in the old Sewers Act; it was expressly declared that tidal rivers should be within it, and as in the later Act, the draughtsman has left out "tidal;" that may be the reason?—No, I think not; the plain intent of the section was very clear and decided, that the keeping out from each parish and district of the flood waters coming from any river, was to be a distinct charge upon the parish or district.

2218. Then if that clause means what you think it means, the vestry have the power now?—I do not know; I do not say that, but it was in order to prevent any question about that that this Bill has been introduced, placing the question beyond doubt, and giving full power to the vestries and district boards to enter upon and, if necessary, purchase the land, and do everything required.

2219. That may be done by one clause declaring that the River Thames was meant by that section?—No, we were advised not.

2220. Why not?—We were advised that it could not be done, and we were advised to adopt this course.

2221. Who advised you?—The learned counsel who drew the Bill, and he advised that this Bill was necessary.

2222. In its present form?—In its present form. Then it became more necessary for the Board to have some controlling power to say to what extent the embankment should be raised. The Board have no desire to interfere with the vestries and district boards, and, if possible, they would rather leave the vestries and district boards to carry out the work by themselves.

2223. Can you tell me the rateable value of the parishes affected?—Yes.

2224. Give me my own parish first?—I have not added it up; the rateable value of Lambeth is 1,032,359 *l*. Take the south side first; these figures have been

been given to me; I presume they are correct. Wandsworth district, 857,422 *l.*; St. Saviour's district, 273,223 *l.*; St. Olave's district, 210,797 *l.*; St. George-the-Martyr's, Southwark, 215,373 *l.*; Newington parish, 349,248 *l.*; Camberwell parish, 556,380 *l.* Mr. C. M. Roche.  
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2225. Does Camberwell touch the Thames?—No, but it may be benefited, and there is power to rate it.

2226. Who is to decide whether it is benefited?—The Metropolitan Board; you have got the plan in evidence, have you not, which is all the part coloured black.

2227. I have not seen it; I should like to see it?—Shall I finish this statement?

2228. Yes?—Bermondsey parish, 350,960 *l.*; Rotherhithe parish, 172,141 *l.*; Greenwich district, 458,975 *l.*; Woolwich parish, 107,753 *l.*; Plumstead district, 275,333 *l.*; that is south of the Thames.

2229. You mentioned Newington; that does not touch on the Thames, does it?—No.

2230. But on the same principle you say it may be rated?—Part of the Newington parish would be benefited by the works that would be done; there is no difficulty in ascertaining that, because by taking the level of Trinity high-water mark, and taking the necessary height to which you would have to carry the works, you can ascertain the area to be benefited.

2231. Then if you could ascertain it so easily as that, why did you not fix it in your Bill instead of leaving it to the discretion of the Board?—Because it is better to leave it to the discretion of the Board. The Board has always acted with great fairness to all the parishes. Whenever it is called upon to settle questions between parishes, the parishes have always been satisfied; we work very well with the parishes and district boards.

2232. Do you know that in some instances the water actually percolates through the existing works, and gets behind?—I do not know anything about the engineering question.

2233. Now tell me what is the rateable value of the district shown upon the plan you refer to?—I have never seen it.

2234. You told me there was one; if there is one, we may as well have it; I am told it was here the first day?—I have never seen it; I saw some evidence referring to that.

2235. What is the rateable value of the area included?—The entire rateable value of the north and south of the Thames is 4,592,259 *l.*

2236. What is the entire rateable value of the Metropolitan Board?—£. 23,136,000; that is the entire area.

2237. Just let me ask you; this is an illustration I will put to you; can you tell me how much of the north side would be within that blue area of which you speak, but for the existing embankments?—I do not understand you.

2238. How much of the north side would be below the level, and liable to contribute, were it not for its being protected by existing embankments?—I cannot tell.

2239. Is not that a consideration?—No, I do not think so.

2240. There would be a portion, of course?—I cannot say that; that is entirely an engineering question. Sir Joseph Bazalgette can give a much better answer than I can.

2241. When you know that one of the objections was that the existing embankments have done the work for certain portions, and therefore you might exempt them, did not you think it worth while to ascertain whether it was true?—I was not aware it had been said; I thought the main charge was that by our embankment we had caused flooding elsewhere.

2242. Do not you know that it was said that the existing embankments had protected certain districts?—It may have been said.

2243. Was it not one of the incidental things which was thrown in as a make weight, with the public advantages, that these embankments would protect certain of the districts when they were made?—On the south side it was said it would to some extent protect Lambeth, and Lambeth was protected. My impression as to the north side is that there was very little protection from flooding by the embankment.

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Cross-examined by Mr. Pember.

2244. I think that the issue between you and me can be very shortly put. I see you say in answer to my learned friend, on page 132, and in answer to Question 2013, that your Board came to the conclusion that something must be done, and they passed a certain resolution; Mr. Cripps read that to you; that is the resolution, as you told my learned friend a short time afterwards, upon which this Bill was founded?—Yes.

2245. Are you under the impression that this Bill goes no further?—I do not think it goes beyond what was intended by that resolution. This resolution thoroughly justifies the Bill.

2246. I do not know what may be your notion of justification?—No doubt the Bill has more detailed powers, and carries them out more specifically.

2247. Supposing the details are confined by the principle, I should not mind; but are you under the impression that in drafting the Bill the Board have confined themselves to strengthening the power of vestries and district boards, so as to enable them to carry out the provisions of the 59th and 60th Sections of the Act of 1855; and further, that the Board of Works has power to intervene and require the execution of the works; are you under the impression that this Bill is one which is fairly confined within the four walls of that resolution?—The Bill appears to me to fairly and properly carry into effect that resolution; but the Bill itself, and all its clauses have since been approved by the Board, and if the Board thought proper to go even a little further than that resolution, they have done so by the Bill.

2248. Would not it have saved us a little time if you had said the Board has gone further by the Bill?—I would rather leave that to those who desire to construe the Bill.

2249. I will ask at once without bothering you to go through every section of the Bill, just to look at Clause 11, and I may ask the honourable members of the Committee to look at Clause 11 too. I will venture to read that to you: "In lieu of requiring any vestry, district board, or other person under the authority of this Act to execute any such works as aforesaid, the Board may themselves, if they so think fit, on the expiration of a period of twenty-eight days after notice to that effect has been published once in each of two consecutive weeks in some newspaper circulating in the metropolis, and a copy of the same has been affixed to the principal doors of every church and chapel in the district or parish in which such works are intended to be executed, in the place to which notices are usually affixed, proceed to execute such works." Is not the meaning of that section this, that instead of serving any notice upon any district board, or more than one district board, to do any works whatever, under the Act, the Board may, if they like, set to work the day after this Bill receives the Royal Assent, and do everything themselves after giving 28 days' notice; you are a skilled and a candid man?—I think there would be a power to do it.

2250. As there would be that power, would not it, so far as carrying out this part of the power given to the vestry under the Act of 1855 is concerned, be a total extinction *pro tanto* of local self-government in the metropolis?—No.

2251. Will you kindly tell me with regard to the subject-matter of this Bill, how much of local self-government would be left, provided the Board put Section 11 into operation; supposing the whole of the works shown in Sir Joseph Bazalgette's plan had been carried out by the Board under Section 11, after that 28 days' notice, how much of the local self-government of the metropolis would be left, so far as those works are concerned and as this subject-matter is concerned?—The local self-government of the vestries and district boards consists in their managing their streets and lighting their streets; then sewerage —

2252. We are only wasting time; you plainly misunderstood my question; much of the prevention of floods, and the power they have to prevent them under the Act of 1855, would be left to the vestries if Section 11 was put into operation by you?—We leave them little or nothing to do; but it is only a power in our Bill.

2253. How have you confined yourselves to strengthening the powers of the vestries and local boards, so as to enable them to carry out the power of the Act of 1855?—The Bill will strengthen the vestries and district boards very materially; at the same time there is Clause 11, which was inserted under advice.

2254. What

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2254. What is the use of strengthening a man's hands, if you take power to chop them off?—There may be times when they refuse to carry out the works the Board order, and then we may carry them out.

2255. This Clause 11 does not depend upon that; there is power in the Act after 28 days' notice to you, in default, for you to enter and do it, but this is a separate power, and gives the go-bye to everything else in the Bill?—There was no intention on the part of the Board to give the go-bye to the district boards; our policy was to strengthen their hands, and leave them to do the works, unless there was some absolute necessity otherwise.

2256. The way you carry out the resolution is expressed in the Bill?—That is what was intended, and if there is anything beyond that, we will alter or qualify the Bill, if you think it goes too far.

2257. Still harping upon your resolution for the Bill, will you show me any clause, except Clause 12, which gives the vestry the power of entry; will you show me any clause strengthening the vestry. You said the main objections to the existing legislation was that there was no power in the vestries to enter upon land?—Yes.

2258. We will take it as an hypothesis, and that you have remedied by Clause 12, I admit. Now, is it not the fact that every other clause in the Bill is not a strengthening of the hands of the vestries, but a strengthening of the hands of the Metropolitan Board of Works?—I do not think it is so.

2259. Can you show me another clause which is not to give more power to the Metropolitan Boards over vestries, and take it away from the vestries?—It never was the intention or policy of the Board.

2260. I am very glad to hear you say that?—Clause 7 is "Power to Board to require vestry or district board to execute works."

2261. That is power to the Board?—Yes.

2262. Number 5 is power to the Board?—Yes. Number 6 confers upon vestries and Boards of Works of districts the power conferred upon them by Sections 68 and 70 of the principal Act.

2263. We know what the meaning of 6 is; it is merely this, that this Act shall be construed as one with Sections 69 and 70 of the Act of 1855.

2264. Now the 7th clause is power to the Board?—To require the vestries or district boards to execute works.

2265. It is to empower the Metropolitan Board, not the vestries, and empower the Board to order vestries to execute any works which the Board may deem necessary or expedient, with no power of appeal?—No power of appeal; and then the vestries under orders shall proceed to execute.

2266. That is, all power to the Board over the vestries?—Yes, which was absolutely necessary.

2267. I want to see how far the Bill carries out the famous resolution of the 7th April 1876?—The Board has approved of the Bill as well.

2268. There is not the slightest doubt of that; if I were a person seeking power, I should approve of the Bill, if I got power under it?—It is only in the public interest.

2269. Now as to Section 8; I quite admit that gives power to the vestries of the parish, as well as the Board of Works, to make certain highways?—Number 8 is entirely applied to vestries; the district surveyor is mentioned here. Now the district surveyor is an independent officer, perfectly independent of the Metropolitan Board, and also independent of the vestries, and power is given there with reference to his making a highway; and it is entirely with reference to that section that the vestries and the district boards, and the district surveyor, to make their highways; they can ask and say what ought to be done; that is considerably extending the power of the vestries and the district boards.

2270. Now I see Number 9, that is no amplification of the 69th clause; Number 9 is a power for the Board entirely?—In case the vestries do not carry out the works.

2271. Then comes Clause 11, which we have dealt with; No. 12 I take the benefit of?—No. 13 gives you further power.

2272. Along with yourselves?—No. 14 does not affect the question.

2273. Have not I shown you generally, that your Bill goes very far beyond the Resolution of the 7th of April, which was to amplify the power of the vestries and give the Board interference in default of the vestries carrying out these powers?—No, I do not think so.

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2274. Not even Section 11?—Well, Section 11, I think, is rather strong, and if there is any difference between the Metropolitan Board and the vestries upon that there can be very soon an agreement come to.

2275. Now I want to call attention to the point my learned friend, Mr. Cripps, put to you?—The resolution said that the Board should have power to intervene, and require the execution of works; and permit me to say that my Board felt compelled to intervene; there was a great deal said at the time about the flooding and the vestries; some of them did not do what they ought to do. There is no intention on the part of the Board to interfere; we would rather leave the vestries and district boards to themselves.

2276. You admit that there is a vast difference between intervening, if the vestries do not do their work, and anticipating the vestries doing their work by your taking it in hand yourselves?—Yes, but we do not want to take it in hand so much as to point out what ought to be done. I am sure we could agree to clauses with any of the vestries upon that.

2277. Now as to your contribution; I see by clause 15 that you can fix the terms and conditions upon which you are to subscribe?—Yes.

2278. You need not do it at all if you do not like?—No, it is a power always exercised by the Board.

2279. And you can fix your terms and conditions, and the terms and conditions you might fix might be that you would not contribute unless a rate was made in the district to find the interest of the money contributed; for instance, supposing you spent 10,000 *l.* in Limehouse upon works?—Supposing Limehouse spent it you mean.

2280. The money is proposed to be spent there, and we will say that the compensation amounted to three or four times the amount of work done; supposing you said you would subscribe half; could not you say, you, the Limehouse people, shall find the interest of the money, we will not give you the money for nothing, you must give us three or four per cent. for it?—It would be entirely contrary to what is intended by the section; it never has been done yet.

2281. Supposing you subscribed 5,000 *l.*, where would the interest come from?—It would come out of the metropolitan purse.

2282. Supposing that the Metropolitan Board subscribed half, not only in that case, but in the case of all the rest of the works, we will say from 25,000 *l.* to 50,000 *l.*, and the interest came out of the metropolitan purse, would it not be doing exactly what the majority of your Board said should not be done, namely, making the taxation to a very considerable extent rendered necessary by the carrying out of these works, fall upon the whole of the metropolitan area?—So far as the Metropolitan Board would contribute anything towards these works, it would fall upon the metropolitan area, and the Board has taken that power because it has found it most beneficial in many cases. There might be cases of very great hardship in particular parishes or districts where it would be fair and proper to contribute; there might be other parishes and districts where the contribution was not required at all.

2283. You have said that up to this time the district boards have not had the requisite power for doing what is wanted in this matter?—They have always told us so.

2284. And you do not contest that that is not so?—No.

2285. That being so, what reason have you for supposing that if these powers have been sufficient up to this time, or if they were made sufficient henceforth, they would not do what is necessary; have you got any reason?—We were advised that if we came to Parliament it would be necessary to show that there should be some power to compel both sides of the river to be embanked to a certain height; and in order to carry out that one general idea we were advised that it would be necessary to have some power for that purpose, but if the parishes could agree that they would carry their works up to a certain height the Metropolitan Board would be only too pleased to leave them as free as possible.

2286. I ask you to give an answer to the question which I put to you, namely, this: What reason have you for supposing that if the powers were made sufficient the district boards would not carry them out; do you think you have given me an answer to that?—I think I have.

2287. Is that the only answer you have to give?—I think I have no other answer.

answer. Supposing this Act was passed, and the Metropolitan Board had no power of saying to the vestries and district boards, You must carry it up to a certain height, one parish might carry it only to the height of two feet; the next might carry it three feet.

2288. How do you know they would?—They might, and it was thought desirable as to the height of the walls, that they should be carried out upon one general principle which the engineer has suggested; that is all that we want.

2289. Was there any Bill in draft before that resolution of the 7th of April was passed; we hear you have thought of this matter for two years; had you any Bill in draft before the resolution of the 7th of April; have you had any other Bill in draft than this?—I daresay the original draft of this Bill is very different from what it is when it is printed, that is with the draughtsman.

2290. Did you go quite as far in extinguishing the power of the vestries and giving it to the Board of Works?—I cannot tell what the draft of the Bill was in the first instance.

2291. You said Clause 11 was a little strong; has the Bill been made stronger; was not there some appeal once in it?—I have no recollection of that.

2292. You do not know whether Clause 11 is not a new idea?—I do not think it is a new idea; we were advised well upon that by the draughtsman and the solicitor, but beyond what is absolutely necessary for the purpose of protecting the metropolis from floods; there is no intention or desire on the part of the Metropolitan Board to take from the district boards any authority or power whatever; and I am sure the Board will agree to any clauses which may fairly carry that out.

Cross-examined by Mr. Bidder.

2293. I do not want to trouble you at much length; you said there might be cases of hardship; to throw the whole cost upon a frontage district would be a hardship?—I said there might be such; in carrying out a large work like this, that it might be so.

2294. It would be perfectly satisfactory to leave the dealing with those things, and the apportionment of the costs in the hands of the Board?—The Board have always behaved liberally to all the parishes and districts in their contributions.

2295. There would be no danger that the individual members of the Board would be influenced by the consideration of the interests of their own district?—No, I do not think so; I do not think they have ever been influenced by any consideration about their own district in contributing.

2296. That division of 15 to 20 in December last, when 20 voted that a particular locality should pay, and 15 voted that the metropolis should pay, am I right that the 20 who voted were those not frontagers, and the 15 who voted the other side were frontagers, with one exception?—No; you are not right.

2297. The 20 who voted for throwing the taxation upon the frontagers—?—This is the 1st of December 1876.

2298. I see Mr. Bidgood, St. James's, Westminster; they do not front the river?—Do not they.

2299. Then, if they do, they had an embankment made out of the metropolitan rates?—They front the river.

2300. They had the embankment made for them?—Not made for Westminster only.

2301. Does St. James's, Westminster, front the river; I am told that it does not?—If you ask me, you must point out where the districts are, for I cannot tell: I will not venture to say whether there is any part of St. James's that fronts the river. I am told that it does not, but it comes within the area that would have to be taxed.

2302. It is not a frontage district?—It comes within the area to be taxed by the Bill.

2303. It does not?—They tell me it does.

2304. The principle you adopt upon this occasion is the principle that the district which is called upon to do the work shall pay?—No; there is power to apportion it between other districts.

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2305. The

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 Yes.

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2306. They have nothing to do with the river?—No.

2307. Mr. Dalton of St. Martin's district; they have got the Victoria Embankment?—Yes.

2308. Mr. Edward's, Marylebone?—Yes.

2309. Mr. Fairclough, St. George's-in-the-East?—I must ask somebody to point out where that goes down to the river.

2310. I am told it does. Mr. Furniss, St. Pancras; that does not go near the river?—No.

2311. Mr. Hall, Holborn; that does not go near the river?—No.

2312. Mr. Hudson, Woolwich?—Yes, that does touch the river.

2313. Mr. Legg, of Bermondsey; that touches the river?—You have three already touching the river.

2314. Mr. Leslie, St. George's, Hanover-square; that does not touch the river?—I fancy it does.

2315. If it does, they have got the Thames Embankment?—No, I think not, but I do not know the exact boundaries of the districts that come within the area of the Metropolitan Board.

2316. Mr. Lloyd, of Plumstead, that does touch the river?—Yes.

2317. Mr. Phillips, of the Strand; that has got an embankment. Mr. Richardson, of Greenwich; that does touch the river?—Yes, very largely.

2318. Mr. Selway, of Newington?—Newington does not touch the river, but Newington would be liable to be rated under this Bill.

2319. That is Newington upon the south?—Newington parish, which is represented by Mr. Selway, comes within the area of taxation which might be represented by the Bill.

2320. Everything comes within the area of taxation?—The member, though he represents Newington, and though he voted, as you say, still his parish will be affected by it, and will have to contribute towards it.

2321. Newington is not a parish fronting the river?—No, but it is one that would have to bear a portion of the liability.

2322. We will argue that presently; does Mr. Taylor of the City front it?—Yes, he fronts the river.

2323. Everything is done in the City: there is no anticipation of any works there?—The engineer says there is 700 l. of works.

2324. Seven hundred pounds in the City is very small. Thompson of Clerkenwell; Truscott, of the City; Watkins, St. Pancras, and Roche (yourself), Paddington?—Yes.

2325. You are far enough from the river to all intents and purposes. Now come to the other side; Cox, of Chelsea?—Yes.

2326. Fell, of Shoreditch?—He is not on the river.

2327. Harris, of St. Saviour's; Lammin, of Fulham; Le Breton, of Hampstead?—He is not on the river.

2328. Meaden, of Wandsworth?—Wandsworth is clearly on the river.

2329. Munro, of Whitechapel?—That is on the river.

2330. Nathan, of Limehouse?—That is on the river.

2331. Pocock, St. George-the-Martyr?—He is on the river.

2332. Rogers, Camberwell?—He is not on the river, but comes within the area of taxation.

2333. Runty, of Hackney?—He is not on the river.

2334. Taylor, of Lambeth?—He is on the river.

2335. Tolhurst, of St. Olave's?—He is on the river.

2336. Rooks, Shoreditch; and Fowler, Lambeth; so that I do not greatly mis-describe the division as being substantially those; not on the river for the clauses, and those on the river against them?—I do not think so.

2337. With one or two exceptions?—You have given a character to the division which it does not deserve.

2338. It speaks for itself?—Yes.

2339. Now let me ask you this: the Committee have had the estimate of Sir Joseph Bazalgette's put before them, and we know what was shadowed forth in the alternative in his report; has the Metropolitan Board of Works ever come to any resolution committing themselves to the particular way of carrying out the work indicated to this Committee?—No.

2340. Have



2340. Have they pledged themselves not to do it on a much more extensive scale?—No, they have pledged themselves to nothing.

2341. And if this Bill passed, you would consider yourselves perfectly free to put aside altogether the plans and estimates of Sir Joseph Bazalgette, as put before this Committee, and to adopt an entirely different plan, if you thought it expedient?—No, we should not do that.

2342. You would be free to do it?—There would be power no doubt to do it, but the Metropolitan Board of Works when once they have fairly laid a thing before a Parliamentary Committee, seldom depart from that which they have shadowed forth.

2343. You would have no objection to bind yourselves to this particular plan?—We are told that it is impossible to bind ourselves to any particular scheme; every parish and wharf requires to be separately dealt with in the most economical way, and that is the reason why we cannot bind ourselves.

2344. Has the alternative proposal of accomplishing it by one general embankment been discussed at the Board?—Yes, that was considered in the first instance.

2345. Are there any advocates in its favour at the Board still?—I do not recollect any one member of the Board advocating such a proposal.

2346. Then how came it to be discussed?—Because Sir Joseph Bazalgette in his report mentioned it, but it may have been discussed without being advocated; it may have been discussed for the purpose of showing how wholly unnecessary it was, and I imagine that that must have been the result of it. The Metropolitan Board came clearly to the conclusion that anything approaching a general embankment was utterly out of the question.

2347. As the Board, you have not pledged yourselves in any way to the mode of carrying out the work indicated by Sir Joseph Bazalgette to the Committee?—No, the Board generally act on Sir Joseph Bazalgette's advice in matters of engineering; he is a man of very large experience, and we have great confidence in him.

2348. You do not always act under his advice we heard three days ago?—We act generally under Sir Joseph Bazalgette's advice.

2349. You told the Committee that Camberwell is considerably benefited by the execution of the works?—I did not say considerably benefited; I said a portion of Camberwell would be benefited.

2350. I will withdraw the word "considerably;" it will be benefited?—Yes.

2351. And if the district of St. Saviour's was called upon by the Metropolitan Board of Works under this Bill, if it passed into law, to execute works, and those works enured to the benefit of Camberwell, what power is there in any part of this Bill to get any portion of the expenditure out of Camberwell?—There is power under one of the clauses to direct the vestries to do it at their joint expense; it is the 19th clause.

2352. You refer me to the 19th clause: "Where in any parish or district within the limits of this Act the Board execute any works they may by order require payment of and recover the whole, or such part as they may think just, of the expenses incurred by them in respect of the same from the vestry of such district or the Board of Works of such district." I said, supposing we as a district were called upon by you to execute works; this applies to the case of the Board executing works, so that this will not do?—I understood there was a clause.

2353. Take the case that the Metropolitan Board of Works call upon St. Saviour's to execute works to prevent floods which could not benefit Camberwell; show me a clause in which there is power to make Camberwell contribute, after we have done the works?—I was under the impression that Clause 19 was that Clause; if it is not, there can be no objection to insert any words; the intention is that it should be so, and if there is any default in it we will put in the words. Look at Clause 23.

2354. Twenty-three is the clause which empowers you to order two vestries to join in executing works, and to apportion the work to be done, and the expenses between them; my question is if you had ordered St. Saviour's to execute works which enure to the benefit of Camberwell, what power is there to get any contribution out of them?—We were under the impression that the clauses did give us that power; if they are deficient we will put in words to meet it.

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2355. It does not say much for the care with which the Bill is drawn?—We have power to order the two to do it, and the intention was that they should both be consulted, and that we should not order one vestry to do it and get a part of the contribution from another.

Cross-examined by Mr. Williams.

2356. Before this Bill was proceeded with, were copies of these clauses circulated about amongst the various authorities?—I will tell you exactly what was done.

2357. Were copies of the clauses sent to the vestries and district boards?—I will tell you exactly what was done. On the 26th May 1876 it was moved by Mr. Lammin, seconded by Mr. Lloyd, "That the Bill be printed and circulated among the members of the Board, and be considered by the Board after their summer recess." It was printed and circulated, and the Board proceeded to consider it on the 6th of October afterwards.

2358. Copies of the Bill were circulated?—Yes.

2359. In consequence of the circulation of the Bill, were certain memorials presented to the Metropolitan Board of Works?—Memorials have from time to time been presented.

2360. Was the object of those memorials to ask the Metropolitan Board of Works to assess the cost upon the metropolitan area, and not upon the districts?—I must ask you to point out to what memorial you refer; there were so many arguments in the different memorials.

2361. Was not that the effect of some of the memorials?—I would rather refer to a particular memorial.

2362. Take the memorial of Fulham, 24th November 1876. I thought you could answer this generally; if you will tell me that there were some praying that the cost should be charged upon the metropolitan area, that is all I want for my present purpose. First, I will refer to the Fulham memorial, that is dated the 24th November 1876?—A deputation from the Board of Works of the Fulham district attended, and they presented their memorial.

2363. This is the last paragraph of the memorial: "And your memorialists humbly pray that your honourable Board will take such steps as may be necessary for the alteration or modification of the Thames River (Prevention of Floods) Bill, or for the introducing in Parliament of such a Bill as will enable your honourable Board to carry out such works of embanking the River Thames, and to authorise your honourable Board to raise the funds necessary for such works in like manner as funds have been raised for the construction of the Victoria Embankment, Albert Embankment, and Chelsea Embankment, or in such other way as may lead to a fair and equitable adjustment of the cost of the said works, over the whole of the metropolitan area"?—Yes.

2364. Do you remember that memorial being presented to the Board?—That memorial asked the Board to take upon itself the execution of the works, to set aside the local self-government of all the vestries and district boards, and to pay for it out of the Metropolitan Board funds.

2365. We have read that paragraph of the memorial, and that is sufficient. Was a memorial presented by the Lambeth Board to the same effect?—No, I do not think they have said that.

2366. We will let that pass; were such memorials as were presented to the Board referred to the General Purposes Committee of the Metropolitan Board of Works?—Yes.

2367. And in consequence of their consideration of the matter, did that committee report in the following words to the Board: "That the Thames River (Prevention of Floods) Bill be referred to the Parliamentary Committee to revise the same, so as to make the cost incurred in the erection of any necessary works (which, according to the Bill as now drawn, is made a charge on adjacent districts and parishes), a charge upon the whole metropolitan area." Did that committee make that report to the Board?—Yes, that matter came on for consideration by the committee at the fag end of the meeting of the committee; there were not many then present; those who were in favour of the riverside property not being taxed, remained to the end; and the result was that by the casting vote of the chairman it was recommended to come up; it did come up to

to the Board, and previous to it being considered, it was moved that the consideration of the resolution should stand over until the discussion had taken place on Mr. Fowler's motion.

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2368. After the presentation of that report by the committee, did you have this discussed on the 1st December 1876, when there was the division to which my learned friend Mr. Bidder has referred?—Yes.

2369. That was for rescinding the previous resolution of the Board in favour of this Bill?—No; rescinding the motion agreeing to the clauses of the Bill.

2370. Then we have the division of 15 to 20, which my learned friend Mr. Bidder has drawn attention to?—Yes, and then this very question was dealt with.

2371. Then after that, on the 1st February 1877, was another resolution brought before the Metropolitan Board of Works to this effect: "That the River Thames (Prevention of Floods) Bill be referred to the Parliamentary Committee to revise the same, so as to make the cost incurred in the erection of any necessary works (which according to the Bill as now drawn is made a charge on adjacent districts and parishes) a charge upon the whole metropolitan area?"—Allow me to look at the minutes.

2372. On that occasion did not the chairman rule that inasmuch as the Board, on the 6th of October last, approved of the preamble and clauses of the Bill, as then submitted to them, the motion to adopt the recommendation of the committee could not be put?—If you allow me to look at the minutes, I will tell you; it is impossible for me to recollect the entire minutes.

2373. Do not you remember this; it was on the 1st February 1877?—I have no note of it among the papers. On the 2nd February 1877 there was a meeting.

2374. I may be wrong about the date; it was the meeting held by adjournment?—I do not recollect it without referring to the minutes.

2375. I believe you were a very regular attendant?—I cannot recollect without referring to the minutes; I would if I could.

2376. I think I had better now ask you to continue giving the Committee information as to the rateable value of the parishes and districts in the metropolis. My learned friend Mr. Littler asked you as to the south side of the river, and asked the total; but he did not ask the rateable value?—I did not give the total.

2377. He did not ask you the rateable value of the districts on the north side of the river?—No.

2378. I need only ask you for the rateable value of the Fulham district?—£. 343,217.

2379. What is your district?—Paddington is not in this.

2380. What is the rateable value of Paddington?—I have not got it; these are only parishes on the river side, or affected by the Bill.

2381. Can you tell me the rateable value of Paddington?—I think it is over 1,000,000 £.

2382. £. 1,078,000, that is the parish that you represent at the Board yourself?—Yes, while I represent the parish I go there to do what is right for the metropolis at large, not for the parish.

2383. When the Bill originally was before the Committee, when it was circulated about in the way you describe, it was not in the form in which it now is. I think you told my learned friend Mr. Littler that?—No, I did not.

2384. Is it the fact that the Bill circulated about was not the Bill now before the Committee?—The Bill that was circulated about as altered, or approved by the Board, when it did approve of the Bill and clauses, is the Bill now before the Committee.

2385. You did circulate a Bill different from that now before the Committee?—I do not say so.

2386. Look at that Bill and tell me what that is (*handing a Bill to the Witness*)?—That Bill was never circulated, and never approved of by the committee in any way whatever; that was the draft of the Bill which was sent confidentially and privately to members of the Parliamentary Committee before it had been seen or considered by the committee, and the member representing the Fulham district got possession of that document, as a private and confidential document, as a member of such committee.

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2387. I do not know that anything affecting the Lambeth district can be called confidential; it is not marked confidential in any way?—In consequence of what took place as to that Bill, all the documents which have been sent since have been so marked, but it was never authorised by the Committee.

2388. Who gave instructions for the preparation of this Bill as it is now?—Which Bill do you speak of?

2389. The one I put into your hand; the draft Bill, which you say never was approved of?—No, I do not know who instructed the draughtsman to prepare that Bill.

2390. When this Bill was prepared, were not you a member of the Parliamentary Committee?—Yes, I was.

2391. Were not you the chairman of the Parliamentary Committee?—Yes, I was.

2392. Did you not give instructions, or take an interest in the instructions given for the preparation of this Bill?—The instructions that were given—

2393. Will you answer that question?—I did take an interest.

2394. Did you give instructions?—No, I gave no instructions.

2395. What did you know about the instructions; did you consult with those who were to give instructions for the preparation of this Bill?—That Bill, I believe, was prepared—

2396. Will you answer the question; did you consult with those who were to give instructions for the preparation of the Bill?—We consulted with our solicitor, but we never instructed him to prepare the Bill upon that basis.

2397. At that time, were you under the impression that private proprietors all along the bank were compellable to keep out the floods?—Certainly not.

2398. I will read the 8th clause of that Bill; who gave the instructions for the preparation of the Bill?—I say I was perfectly well aware that they were not compellable, and I always contended that there was no right to put any such liability upon them.

2399. Then you were more certain than the Lord Chief Justice was, because the case of Hudson and Sabor had not been decided then?—I am not quite sure whether it had or not, but I had no doubt, from my knowledge of the Commissioners of Sewers and the law upon the subject, that there was no liability upon the owners of property, except by prescription or tenure, to fence against the sea.

2400-1. You have told me confidently that, in December 1876, you were not opinion that private proprietors were not compellable to keep out the floods?—Except they came within the clauses of the Act, that they were liable by tenure or prescription.

2402. Did you say this at the meeting of 1st December 1876: Mr. Fowler made his speech, and then the division took place; did you hear Mr. Fowler say that he contended that the law, as you now state, did not make owners liable for the effect of inundations of property situated behind them; and added that the Board were now about to repeal what had been the common law of the land, and make owners of waterside properties alone responsible for the prevention of floods. Then, having heard Mr. Fowler say that, did you interrupt him and say, the honourable member is making a statement that is utterly and entirely incorrect. Just before the division took place Mr. Fowler having said that owners were not liable by common law to keep out inundations, I ask whether thereupon you said, the honourable member is making a statement which is utterly and entirely incorrect?—It is impossible for me to recollect every word that I may have said in a debate at that time; but if it is intended that Mr. Fowler said that the owners were not liable to do it, I agree with him.

2403. You said that what he said was incorrect?—Then I am wrongly reported. Hudson and Sabor was decided long before that.

2404. Because Mr. Fowler referred to it?—Then I am wrongly reported.

2405. Now, I will draw attention to what you said on 6th January 1877. You made a speech upon that occasion with reference to this Bill. I ask you, did you say this—?—Was it with regard to this Bill?

2406. With regard to this Bill about the inundation. It is a discussion on the memorial from Lambeth. You made a speech, and you are reported to have said this. I will read the report:—"The responsibility rested not with the Board but with the vestries and with the district boards, and with the owners of property immediately abutting upon the river, and until some improved legislation was laid down by Parliament it was for those parties to take steps to prevent these inundations taking place." Did you say that?—They have

have left out the words which I used, "Owners liable by prescription, or tenure, or otherwise." Mr. C. M. Roche.

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2407. You say again you have not been correctly reported?—No; what I stated distinctly at that time was this, that there was no responsibility on the Board, and no power; that it rested entirely with the vestries and district boards, and with the owners of property who by prescription, or tenure, or otherwise, were liable to raise their embankments.

2408. Have you before you the Blue Book which I have in my hand containing the Report of the Metropolitan Board of Works for 1875?—No.

2409. I thought you had been referring to that?—No.

2410. Can you point out to me or direct my attention to any works done by the Board which have been charged upon any parish or district which have not been charged in fact upon the metropolitan area?—I do not recollect any.

2411. Here are all these Embankment Acts?—They are metropolitan improvements.

2412. And then there are the Improvement Acts for the streets and so on; there is the Park-lane Improvement?—Yes, that is a metropolitan street improvement.

2413. High-street, Kensington?—That was a metropolitan improvement; they are all in the same category.

2414. And Whitechapel?—Yes, that is the east end of London; that is a street improvement.

2415. Holborn?—That is another street improvement.

2416. As to Holborn, Middle-row was taken down?—Yes.

2417. Have not those houses since Middle-row was taken down been benefited 50 per cent. at the least?—In all probability, in that particular case, there was a considerable benefit to that property; it was a most exceptional case of benefit arising to any adjacent property, but the benefit to the metropolis at large in facilitating the traffic between the City and West End was far beyond any increased value to those premises.

2418. Now in what parish is Park-lane?—St. George's, Hanover-square.

2419. The improvement there has greatly increased the value of the houses adjoining the place where the improvement took place, has it not?—If you had heard the evidence given before the Committee —

2420. Is that so?—No, on the contrary, it has decreased their value, and the evidence against the improvement was, that opening up the thoroughfare would make such a decrease in value, that we had to pay very heavy compensation.

2421. Do you remember the discussion that took place at the Board about the Harrow-road Improvement?—There was a discussion; I do not recollect it.

2422. You know that there was a discussion?—Yes.

2423. The Harrow-road Improvement was made at the expense of the metropolitan area, was it not?—Yes, that is another street improvement.

2424. Was it originally resolved it should be treated as a local improvement?—That I cannot say; there was some discussion about its being a local improvement, but the Board treated it ultimately as a metropolitan improvement, in the same way that Park-lane and Whitechapel have been treated.

2425. You cannot say that the Harrow-road is one of the great thoroughfares of the country like the Northern-road?—The Harrow-road is one of the great thoroughfares which goes on to Harrow; it is being built upon enormously; there is a large traffic there, and Parliament was satisfied, in passing the Bill, that it was in that category.

2426. The Board having resolved to treat this as a local improvement?—I do not say that the Board resolved to do it; there was some discussion upon it, but whether the Board resolved that or not I cannot say.

2427. I must ask you whether that is not so?—If you show me any minute in which it is so stated I will be satisfied. It was discussed, but I am not sure about any resolution; at all events, Parliament considered it a proper metropolitan improvement.

2428. That was in the year 1871?—Yes.

2429. Harrow-road is in the Paddington parish; do not you remember in pressing upon the Board of Works the importance of treating this as a matter of metropolitan interest?—No doubt about it.

2430. That is the view you took?—Yes, and Parliament sanctioned it.

2431. Was not that the view that you took yourself?—There is no question about it.

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2432. Before you had pressed that view upon the Metropolitan Board of Works, do you remember that the Metropolitan Board of Works had passed a resolution that it was to be treated as a local improvement?—I am not sure that any resolution was passed; it was discussed, but whether there was a resolution passed, my recollection will not enable me to say, without referring to the minutes.

2433. You do not remember that?—No.

2434. And you cannot refresh your memory by any minutes?—No.

2435. What did that cost?—It is not calculated.

2436. The 30th of May 1870 is the date; what has it cost so far?—I do not know.

2437. £. 124,000 was the estimate?—I really do not recollect the estimate.

2348. Not any approach to it?—No, it is all in the minutes of the Board, but it is not yet carried out; they are now widening the street; the property has been taken down, and they are now widening.

2439. You have told me the rateable value of Fulham is 343,217 *l.*?—Yes.

2440. Fulham is within the metropolitan area, and sends a member to the Metropolitan Board?—Yes.

2441. Do you know that Fulham has been engaged also in large drainage works of its own?—Yes, it has to drain its district, like all other districts.

2442. And do you know that the charge at the present moment upon its rates amounts to 83,000 *l.*?—No; they borrowed a large amount of money, and there is no doubt that a large quantity of land there will become very valuable by reason of that expenditure; instead of being market gardens and swamps it will become building land.

2443. Does not the charge upon the rates amount to 83,000 *l.*?—It may be so. If you say so, I will believe it.

2444. You know that the Fulham Board of Works owe a large sum to the Metropolitan Board?—I do not know whether we lent it them.

2445. Then you, a prominent member of the Board, cannot tell me whether the Fulham Board of Works does not owe the Metropolitan Board 83,000 *l.*?—I should not think it did, but I will get the fact; I fancy you will find a statement in the Report of the amount due to the Board from the various vestries. If you want the exact detail, I will give it you. I do not know whether they borrowed from the Board or from other parties.

2446. Can you ascertain it, because I see by the Act of Parliament that the Fulham District Board cannot borrow without the consent of the Metropolitan Board?—You know the facts much better than I do, and you will have no difficulty in putting them in evidence.

2447. I want the full debt of the Fulham Board at the present moment; you are promoting in Parliament this year a Bill, the Metropolitan Streets Improvement Bill, in which you propose certain improvements of Millbank?—Yes.

2448. And the cost of making the various improvements is to be charged upon the metropolitan area?—It will not be now.

2449. That was the Bill you promoted?—Yes.

2450. And with reference to that Bill, did Sir Joseph Bazalgette report, "The improvement will have the further effect of protecting the neighbourhood from the floods from which it has so frequently suffered on the occasion of high tides"?—I have no doubt that he did. That portion has been thrown out from the Bill.

2451. In the Report of the Board in 1863, was it said that the Thames Embankment, south side, when completed, would protect the wharves and properties along the river bank which are now subject to frequent floodings on the occasion of high tides, and will facilitate greatly the means of traffic on the south of London?—If you say that is in the Report I will accept it.

2452. It is in the Report of 1864. With regard to the same measure, did they say, "These works will be of great benefit to the district, and will provide increased accommodation for the traffic; and what is most important, will protect the locality against the serious floodings to which on the occurrence of high tides it has been for many years liable"?—If that is in the Report I will take it from you.

2453. The cost of making these works and improvements was imposed upon the metropolitan area?—Yes, but they were not undertaken solely for the purpose of protecting the district from flooding; they were undertaken mainly for the purpose

purpose of street improvements and facilitating the traffic and providing for the main drainage system on the north of London.

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2454. I want to ask a question upon the incidence of taxation; do you know that it was the opinion of Sir John Thwaites that for all great improvements of the kind that I have been indicating, not only a charge ought to be made upon the metropolitan area, but also that the metropolitan funds ought to be assisted by Imperial taxation?—I never heard Sir John Thwaites express any opinion that the works that are now proposed by this Bill should be charged upon the metropolis at large.

2455. Have I asked you that?—I understood you to say so.

2456. I said all great works?—Metropolitan works, certainly; not local works.

2457. In a letter that he wrote in the year 1859, did not Sir John Thwaites express an opinion to the effect that I have given you, as to great metropolitan improvements; he said that in his letter?—It is very difficult to remember all Sir John Thwaites' letters.

2458. Upon an important matter of this kind, the opinion of Sir John Thwaites would receive the weight it deserves from the honourable Committee; in support of the view that I am presenting to you, that Sir John Thwaites not only thought that it ought to be charged upon the metropolitan area, but that all improvements ought to have assistance from the Imperial revenue, I will ask do you remember Sir John Thwaites writing a special letter to the Government in 1869?—He did write a special letter.

2459. Is this the effect of the letter: "But very different considerations apply to vast and costly works, such as the Thames Embankment; the formation of the works, and the making of new and spacious thoroughfares, to meet the exigencies of the city, which is at once the seat of the Imperial Government and the centre of the commerce of the world; these never have been regarded as matters of merely local concernment"; do you remember an opinion to that effect expressed by Sir John Thwaites?—In what sense he used the word "local" I do not know; whether it is local as regards the metropolis, or local as regards the districts.

2460. Do you know whether the same views were entertained by Mr. Scott, the Chamberlain of the City of London?—I do not know what views Mr. Scott entertained.

2461. Can you give me any definition, which a plain man can understand, as to what you mean by metropolitan improvements, and what you mean by local improvements?—I will tell you so far as it is possible to draw a line. Metropolitan improvements are those which from their extent are useful, not simply in the district itself, but where they facilitate the traffic, or enable people to enjoy themselves, as in parks; and where all London can get an equal benefit, then it becomes metropolitan; but with regard especially to what we are now asked to do, the benefit is local. I will take the parish of Fulham as an example; the benefit to be derived from the embankment there will be to Fulham alone. Fulham will get the benefit of the embankment by reason of its land, which is now being constantly flooded, letting at a much higher rental when the embankment is constructed; that area will get the benefit by the expenditure, and only those parishes on the banks of the river get the benefit by the expenditure proposed, and the rest of London has no such benefit.

2462. Supposing there were effectual works done for the protection from inundation, would not those works improve the general character of the Thames. I mean not such works as Sir Joseph Bazalgette has now suggested, but substantial works along the foreshore of the Thames?—The Thames would not be improved, but the districts would be benefited by not being flooded; there would be no improvement in the Thames.

2463. Would not the bed of the Thames be improved?—That is a question which the scientific evidence, which you have had before you, can decide better than I can. I can see no benefit to the Thames. I see no benefit except to prevent the district being flooded, and the properties in the district would be rendered more valuable by being prevented from being flooded.

2464. Let me put it hypothetically: supposing the Thames is improved by any work being done, would not it be an advantage to the whole of London?—I do not understand what you mean by an improvement of the Thames.

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2465. Is not the Thames, as Sir John Thwaites said, the chief highway of London?—I do not understand what you mean by an improvement of the Thames.

2466. I ask you to assume the fact?—I can understand the improvement of the property on each side of the Thames; I can understand the Thames being dredged, and therefore giving increased facility for navigation.

2467. Have you ever been aground yourself in the Thames?—Not in this part of the Thames.

2468. Have you been aground anywhere on the Thames?—Yes.

2469. Do you not think it would be an advantage if the Thames were deepened so as to prevent that happening?—The deepening of the river depends not upon its embankment but upon dredging.

2470. I ask you to assume the fact, supposing the Thames is improved, it would be a metropolitan benefit?—I do not see that it would be.

Cross-examined by Mr. Greene.

2471. Can you give us the names of any persons referred to in the 22nd section as being liable by prescription, or tenure, to execute works?—We have no names; that is simply repeating the language of the Act of 1855.

2472. Have you any reason to believe that there are any persons now liable by prescription, or tenure, or otherwise?—Looking to the large number of persons who have, in pursuance of the letter of Sir Joseph Bazalgette, asking them to do the works, done them without any question whatever, I take it that there must be a considerable number of persons who, by tenure or otherwise, are liable.

2473. You know of none?—No.

2474. And have the Board obtained no returns of any such persons?—There is no possibility of obtaining such returns.

2475. In what way do you propose to ascertain whether a person is liable by prescription or tenure, in order to know whether they are the right persons upon whom to make the charge?—That is the duty of the vestries and district boards.

2476. That is not so always; you are able to direct the persons liable by prescription, or tenure, or otherwise, by law to contribute a part; in what way do you propose to obtain the liability of the persons?—It depends upon who does the work.

2477. Whoever does the work must ascertain who is liable by prescription or tenure?—That is the duty of the vestry or district board who does the work.

2478. Have you any machinery to suggest by which the Board, or the vestry, can ascertain who is liable by prescription, or is it to be left to the law still?—I apprehend there would be no difficulty in it; there is no machinery provided by the Bill.

2479. Are you aware that under the old system of the Commissioners of Sewers a jury was empanelled to ascertain who was liable by prescription, or otherwise?—I think the jury went far beyond that.

2480. Whether they went beyond it or not is immaterial?—The jury no doubt, under the old Act, had power to find out if it was so; but it was not binding, I think, but that was not the real object of the jury; the jury was to find out those who were liable to pay, not those liable to be exempted.

2481. Are those words put in without the knowledge of any persons who may be affected thereby?—They are put in from a public Bill.

2482. Without the knowledge of whether there are such persons or not?—There is notice of the Bill; we know of no individual case, if that is what you mean; if they crop up, they will be dealt with from time to time.

Cross-examined by Mr. Balfour Browne.

2483. You have seen the estimates, have you not, which were submitted to the Committee yesterday?—I heard what was said.

2484. Were not they submitted to the Board?—No, not so much in detail as that.

2485. Have the estimates, which were sent to the various persons, never been submitted

submitted to the Metropolitan Board of Works?—Not in detail; we were prepared for a larger expenditure than that which appears now to be necessary.

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2486. Then the work and estimates, and the plan you submitted to the Committee, are submitted entirely on Sir Joseph Bazalgette's authority?—Yes; but he will receive the support of the Board in what he has done.

2487. Did you have a report from Sir Joseph Bazalgette as to the works necessary before you sent out the circulars to the various riverside proprietors in January 1877?—There was no detailed report; we authorised the letter to be sent, and Sir Joseph Bazalgette was to give them such information as to the height that it would be necessary to raise their walls to, as would enable them to carry out the necessary works.

2488. That circular was submitted to the Board, was it not?—The circular of Sir Joseph Bazalgette that you refer to was considered by the committee or the Board.

2489. All those circulars are signed by Mr. Wakefield, the clerk to the Board?—Yes.

2490. And I may take it, I suppose, that it was by the authority of the Board that those circulars were sent out?—Yes.

2491. Are you aware that a very large number of proprietors upon the river bank who got notice to do a certain thing in January 1877, are not now included in the estimate put before this Committee?—Sir Joseph Bazalgette stated that yesterday.

2492. Did you see the report submitted by your engineer to the Metropolitan Board of Works on the 26th March 1877. That is the report, is it not (*handing a Report to the Witness*)?—Yes.

2493. In the first schedule to that report, Sir Joseph Bazalgette mentions the cases in which the circular of the 10th of January has been complied with?—Yes.

2494. And in the second schedule to that report he mentions the cases of non-compliance or only partial compliance?—That is so.

2495. If you will look at that, at pages 37 and 38, I will read out the names of the wharf proprietors: No. 152, Sun Wharf, Tooley-street; 153, Topping's Wharf, Tooley-street; 155, Chamberlain's Wharf, Tooley-street (not quite up to standard height); 156, Cotton's and Dépôt Wharf, bonded warehouses, Tooley-street; 157, Hay's Wharf, Tooley-street; 158, Wilson's Wharf, Mill-lane, Tooley-street; 160, Griffin's Wharf, Morgan's-lane, Tooley-street; 161, Gunshot Wharf, Morgan's-lane, Tooley-street (protection insufficient in height, and not permanent); 162, Symond's Wharf, Morgan's-lane, Tooley-street; 165, Kitchen's Upper Wharf, Pickle Herring-street. Then on the next page, 38: 170, Marks Browne's Wharf, Pickle Herring-street; 172, Davis' Wharf, Pickle Herring-street." Now, are you aware that every one of those are mentioned in the 2nd schedule of this report as wharves in which the circulars of the 10th of January have not been complied with?—If it is there mentioned, it is so.

2496. Tell me why none of those wharves are included in the estimate laid before this Committee?—I do not know why they are not. I have nothing to do with the estimate, and you should have asked Sir Joseph Bazalgette.

2497. I ask you, as representing the Metropolitan Board of Works, why have you submitted such a defective estimate to this Committee?—I have not submitted any estimate.

2498. You are chairman of the Parliamentary Committee?—No, I am not.

2499. You are here representing the Metropolitan Board of Works?—Yes.

2500. And you say you approved of this estimate, which we submit to be utterly fallacious, by reason of this very report which I hold in my hand. It was submitted to this Committee as a full estimate of the works to be required under this Act?—Sir Joseph Bazalgette has submitted his estimate, and he is responsible for its correctness.

2501-2. Sir Joseph Bazalgette is a servant of the Metropolitan Board of Works?—No doubt; he has submitted his estimate; you say it is fallacious; I daresay if Sir Joseph Bazalgette was here he would say it is not fallacious, but perfectly correct. I am not aware whether it is fallacious or not. I think I heard Sir Joseph Bazalgette say yesterday that although there were properties in that report, where the works had not then been done, they have been done since.—It may be possible that some of those may have been carried out between the time of his report and the survey that he made the other day.

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2503. One of the wharves mentioned was Butler's Wharf. Are you aware that a letter was sent to the Metropolitan Board saying that no raising of the walls was necessary, and that the proprietors of that wharf refused to do anything?—I do not remember the case.

2504. Do you know Butler's Wharf is not mentioned in the estimate?—I know nothing of Butler's Wharf at all; whether it is in the estimate or not. Sir Joseph Bazalgette is the proper person to ask those questions of.

Cross-examined by Mr. *Armstrong*.

2505. You said in answer to Question 2061, which was, "I think you have prepared yourself, if necessary, to enumerate to the Committee a great number of cases of Commissions of Sewers, all of which proceed upon one principle, a contribution from those who are benefited by the expense." "Yes; the entire law of sewers has been that the area benefited by the works is the area to be taxed; that is the principle of every Commission of Sewers." Is it not also true that the principle on which the Commissions were formed was that they should consist of residents in the district to be taxed; the Commission for each district was formed of gentlemen residing in the district which had to be taxed?—I am not aware of that; I should think it is not improbable that there may be some outside.

2506. I think not?—I am not aware of that; my mind has never been drawn to that point, and I would not like to give any definite answer.

Re-examined by Mr. *Bazalgette*.

2507. My learned friend Mr. Richards asked you on behalf of the Conservators of the Thames, with regard to clauses affecting them in the present Bill. I will ask you to turn to the Metropolitan Main Drainage Act, 21 & 22 Vict. c. 104, s. 28 and 29?—Yes.

2508. I will ask you to compare those two clauses with Clauses 14 and 25, being the two clauses which affect the Conservators in the present Bill, and to tell me whether the language in each case is not precisely identical?—Clauses 14 and 25 of this Bill are identical with Clauses 27, 28, and 29 of the Metropolis Local Management Act, the 21 & 22 Vict. c. 104, being the Main Drainage Act.

2509. So that when my learned friend asks you to omit the words from Clause 25 of the present Bill, "so far as such rights, power, authority, or jurisdiction may be exercised for the preserving of the free navigation of the River Thames," he is asking you to omit words which already form part of existing legislation?—Yes.

2510. The legislation which regulates the relations between the Metropolitan Board of Works and the Conservators of the Thames as affecting the river?—Yes.

2511. Now upon the question of voting, I think my learned friend Mr. Littler asked you a question; I understand by the resolutions of the Board which were passed on the 6th of October 1876, the preamble of the Bill was approved by 21, against a minority of nine?—Yes.

2512. So that in fact the preamble of the Bill was approved by the Board by a majority of 12; I am referring now to the original motion of the Board of the 6th of October 1876: it was then put to the vote, when there were 21 against nine, and it was declared by the chairman to be carried, and it was resolved that the preamble of the Bill be approved; the figures are 21 for, and nine against?—"The original motion was then put to the vote, when there were, for it, 21, against it, nine, and it was declared by the chairman to be carried; and it was resolved that the preamble of the Bill be approved." So that, in fact, the preamble of the Bill was carried at the Board, and approved at the Board by a majority of 12?—Yes, out of 30 present.

2513. The second resolution put had regard to the approving of the clauses?—Yes.

2514. And the clauses of the Bill were approved by a majority of six, there being 18 present?—Yes.

2515. Then

2515. Then on the 1st December 1876, the motion for rescission was made? *Mr. C. M. Roche.*  
—Yes.

2516. But that motion for rescission simply referred to the resolution which approved of the clauses of the Bill?—That is so.

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2517. The effect of that motion of rescission was that the clauses of the Bill were again approved by a majority of five?—No; they refused to reconsider them.

2518. So far as the Bill is concerned, the preamble has from the very first been approved of by a majority of 12 members of the Board, 30 being present?—There were two-thirds of those present in its favour.

2519. You have been asked whether a Bill similar to the present Bill, without plans and without estimates, including compensation, has ever yet been presented to Parliament. I ask you whether the 21 & 22 Vict. c. 104, the Main Drainage Act, was not a Bill which had that character and description?—I have so stated.

2520. Let me refer you to Section 21, page 221, of Mr. Woolrych's book; is it to this effect: "The Metropolitan Board shall cause to be commenced as soon as may be after the passing of this Act, and to be carried on and completed with all convenient speed according to such plan as to them may seem proper, the necessary sewers and works, for the improvement of the main drainage of the metropolis"?—Yes, those enormous works were carried out under that extensive power.

2521. No plan in that case was ever deposited previous to the Bill coming before Parliament?—No, and it was very fortunate that it was not so, because as we went on from time to time, specially as regards the district of Fulham, we made alteration very much to the benefit of Fulham; if we had been bound down by a hard-and-fast plan we should have had to come to Parliament to alter it.

2522. So that, in the case of the Main Drainage Act, so far as plans were concerned, the usual formalities of depositing plans were not complied with to anything like the same extent to which they have been complied with in the case of the present Bill?—Nothing approaching it; the Board was left entirely free. I may say that previous to that I believe it was necessary to obtain the assent of some Government department, and Parliament freed us from that, and left us entirely free.

2523. Upon the faith of that Bill, which they presented without any plans, as you have stated, being deposited, did the Metropolitan Board of Works obtain sanction from Parliament for the borrowing of three millions of money?—Yes, I think it was three millions of money.

2524. In that case also I believe there was no detailed estimate prepared?—No.

2525. There was the same sort of general estimate for borrowing the money as has been presented to the Committee, in the case of the present Bill. I am told that there was no estimate at all?—My impression is that there was some general estimate; the Board had taken very good advice upon it, and you may depend upon it there was some general estimate as to what the expense was likely to be; whether it was presented before the Committee of the House of Commons or not, I will not say.

2526. It was simply as a guide to borrow the requisite amount?—Yes, and to know what the expenditure was to be. We should never have gone on with a large work of that character without considering what we were going to do.

2527. As to the present Bill and the formation of the estimate, I will ask you whether you have sufficient experience of compensations to be able to say whether an estimate of the probable amount of compensation which would have to be paid under the Bill could be made at present?—I do not see how you could possibly do it; it is possible that with one man, if you can come to an agreement with him, certain works may be done at a small expense, and no compensation will have to be paid; it may be that he will be wanting to get compensation, and he will do everything he can to get compensation. It would be impossible to make any estimate until we deal with each case in detail.

2528. Will not it be necessary before any such estimate can be made, first that the person making it should be acquainted with the different interests existing in the various premises, and the particulars of the trade, and the way in which it was carried on?—Yes.

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2529. Those being particulars which can only be satisfactorily obtained when a particular claim arises?—Yes, that is all.

2530. The claim, in fact, will have to be sifted in the usual way before the proper tribunal to which it would come?—Yes, and those claims would be of a somewhat exceptional character; it is not as if you are going to buy a man's house or trade; then you could estimate the compensation; but if you are going to put something up, and he says, Now you materially interfere with my trade, that sort of compensation is one which would have to be carefully considered before you could arrive at anything approaching a fair amount.

2531. As to taking lands compulsorily by any provisions of this Bill, the Lands Clauses Act applies in the usual course?—Yes.

2532. They would apply in the way provided by the 18 & 19 Vict. c. 120, sect. 152?—We have taken power to take lands compulsory; there would be very few instances where it is at all necessary.

2533. Now turn to the clauses in the principal Act, the 18 & 19 Vict. c. 120, sec. 152; will you just read Clauses 152 and 153 at page 114 of Mr. Woolrych's book?—Clause 152 of the 18 & 19 Vict. c. 120, is as follows: "Provided always, that the provisions of the said Lands Clauses Consolidation Act, with respect to the purchase and taking of lands otherwise than by agreement, shall not be incorporated with this Act, save for enabling the Metropolitan Board of Works to take land or any right or easement in or over land, for the purpose of making any sewers or works for preventing the sewage or any part of the sewage within the metropolis from passing into the Thames in or near the metropolis, or otherwise for the purpose of the sewerage or drainage of the metropolis; provided also, that no land, or right or easement in or over land, for the purposes aforesaid, shall be taken compulsorily by the said Board, without the previous consent in writing of one of Her Majesty's Principal Secretaries of State."

2534. Now will you read Section 153?—"The Metropolitan Board of Works before applying for the consent of the Secretary of State for taking land, or any right or easement in or over land, compulsorily as aforesaid, shall publish once at the least in each of four consecutive weeks in one of the daily newspapers published in the metropolis, an advertisement describing the nature of the works in respect of which the land, right, or easement is proposed to be taken, naming a place where a plan of the proposed works is open for inspection at all reasonable hours, and stating the quantity of land or the particulars of the right or easement that they require for the purposes of such works, and shall serve a notice on the owners or reputed owners, lessees or reputed lessees and occupiers of the land intended to be taken, or of the land in or over which such right or easement is intended to be taken, such service to be made four weeks previously to the application to such Secretary of State, and such notice shall state the particulars of the land, right, or easement so required, and that the Metropolitan Board are willing to treat for the purchase thereof, and as to the compensation to be made for the damage that may be sustained by reason of the proposed works,"

2535. Those provisions with regard to the taking of land compulsorily, have to be imported into the present Bill?—Yes.

2536. So that in fact before the vestries or district boards or the Metropolitan Board of Works could take land compulsorily, they would have to deposit plans; also to advertise and give proper notices; and finally, to apply to the Secretary of State for leave?—I apprehend that that is clearly so.

2537. Now it is suggested to my learned friend, Mr. Littler, as regards the high-level sewer and the low-level sewer in the main drainage, that they were local improvements, that is to say, for the benefit of the district; the low-level district of London was not provided for in any way, or benefited by the construction of the high-level system and *vice versa*; taking the main drainage as a whole, the high level and the low level, is not the benefit clearly metropolitan?—The benefit is clearly metropolitan, but those parishes that are benefited the most are those on the low level along both sides of the river, because it is their sewerage which requires to be pumped up, and that is an enormous expense in our works; they have benefited far more largely than other parts of London by the main drainage system.

Monday, 11th June 1877.

MEMBERS PRESENT :

Sir George Elliot.  
Mr. Gordon.  
Mr. Grant Duff.  
Sir James M'Garel-Hogg.

Mr. Locke.  
Mr. Mark Stewart.  
Mr. Watney.  
Mr. Wilson.

MOUNTSTUART E. GRANT DUFF, ESQ., IN THE CHAIR.

Mr. Guildford Barker Richardson, sworn ; Examined by Mr. Bazalgette.

2538. I BELIEVE you were elected, in the year 1862, as member for the Greenwich district of the Metropolitan Board of Works?—Yes.

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2539. And since the year 1862 you have continued a member of the Metropolitan Board?—I have so.

2540. Have you, during the period that you have been a member, taken an active part in the transaction of the business of the Board?—I have.

2541. I believe you have been Chairman of the Lands Committee, and you were lately Deputy Chairman of the Works and General Purposes Committee of the Board?—I have been Chairman of the Finance Committee. I preceded, as Vice Chairman of the Works and General Purposes Committee, Mr. Roche, who last gave evidence.

2542. Have you also been member of the Committee to which this Bill has from time to time been referred for consideration?—I have been a member of the Works and General Purposes Committee, and also a member of the Parliamentary Committee.

2543. Under these circumstances have you read the evidence given in support of the Bill?—I have read the greater part of that which Sir Joseph Bazalgette gave, and a considerable portion of that which other witnesses have given, and I have heard all that Mr. Roche gave.

2544. Have you taken some trouble to make yourself acquainted with past legislation which have been directed to the subject of the prevention of floods, with the view of ascertaining what the incidence of taxation under different Acts of Parliament were?—I have.

2545. Have you got the Act of the 23rd Henry 8th before you?—Yes.

2546. Commonly known as the Bill of Sewers?—Yes.

2547. Will you shortly state what the object of that Bill was?—The preamble states that “considering the daily great damages and losses which have happened in many and divers parts of this his said realm, as well by the reason of the outrageous flowing, surging, and course of the sea in and upon marsh grounds and other low places heretofore through politic wisdom won and made profitable for the great commonwealth of this realm,” and so on. It proceeds to establish “that Commissions of Sewers and other the premises shall be directed in all parts within this realm from time to time where and when need shall require.” The Commissioners were to be named in each Commission.

2548. Now turn to the particular provision which regulates the incidence of taxation under that Bill of Sewers?—I will first name the Commissioners themselves. The Commissioners must be such substantial and indifferent persons as shall be named by the Lord Chancellor and Lord Treasurer of England, and the two Chief Justices for the time being, or by three of them, whereof the Lord Chancellor to be one. Then in the statute this follows, which it is important to

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keep in view, as the form of Commission has continued from the time of Henry the 8th down to the present time; and every Commission has been issued precisely in accordance with those words which declare that they are appointed through the pressure of the damage being done by the rage of the sea flowing and reflowing; and they have power to repair walls, ditches, banks, gutters, sewers, &c., and all other things of that kind. Then it proceeds under the next section to declare in what way the expenses that shall have been incurred shall be raised: "And all those persons," those persons are the owners of the respective lands in which the said floods may from time to time exist, "And all those persons and every of them to tax, assess, charge, distrain, and punish, as well within the metes, limits, and bounds of old time accustomed, or otherwise or elsewhere within our realm of England, after the quantity of their lands, tenements, and rents, by the number of acres and perches, after the rate of every person's portion, tenure, or profit of fishing, or other commodities there, by such ways and means, and in such manner and form as to you, or six of you, whereof the said A., B., and C. to be three, shall seem most convenient to be ordained and done for redress and reformation to be had in the premises." It then proceeds to order the employment of the necessary persons; it then authorises them to make bye-laws; it then gives the extent of the Commission, which is to be for three years; and it gives power to raise the moneys, if there should be any default in the payment of them, from the tenants with power to the tenants to recover from their respective landlords.

2549. So that, as a fact, I may take it that the salient features of that Bill of Sewers were that Commissions should issue in the form which is extant at the present time; just refer to the section which provides that a jury may be summoned in cases of default?—This is Section 4, commencing "Saved always to us such fines and amerciaments as to us thereof shall belong." There are certain circumstances under which juries are to be summoned by the sheriff, and proceedings are to be taken in certain matters.

2550. May I take it that the effect of the provisions which you have pointed out are to provide that certain Commissions shall issue from time to time within the form in which they issue at the present day, and that all Commissions at that time should have a triennial existence?—Yes.

2551. And that the incidence of taxation shall be on the area of benefit?—Yes, that is so; and it is as nearly as possible the state of the law at the present day.

2552. To follow this out in detail, the next Act passed was the 3rd and 4th of Edward the 6th; that was formal?—It was merely formal, and made perpetual some of the Commissions.

2553. I think then there is nothing until we get to the 13th of Elizabeth?—No. It gives power of distraint, and determines that the Commission shall exist for five years instead of three.

2554. There is one provision, which I omitted to call attention particularly to, in the Bill of Sewers; that is, that the tax, when made, shall be a landlord's tax and not a tenant's tax?—I stated that the tax was to be on the owner, recoverable from the tenant under certain circumstances.

2555. Did the 13th of Elizabeth extend the triennial Commissions so as to give them a 10 years' period of existence?—It did so; there is nothing more that is important in that statute.

2556. The 3rd of James the 1st is the next?—Yes.

2557. That also extends the 1st Act of 23rd Henry the 8th within the metropolis only?—Yes, there is a matter of importance there; it there extends the previous Commission to watercourses falling into the Thames within two miles of London, that they shall be subject to this Commission of Sewers; and that was afterwards extended by the 10th & 11th of Victoria, chapter 70, section 2, further than that.

2558. The next is the 3rd of William and Mary?—There is nothing in the 3rd of William and Mary.

2559. Now the 7th of Anne; that again, I believe, is immaterial, except in so far as it gave power to enforce assessment when made?—That is the main purpose of the Act, to give greater power for the enforcement of the assessments against copyholders as apart from freeholders.

2560. In all these cases the same incidence of taxation provided by the principal Act has been carefully observed?—Yes.

2561. Now



2561. Now the 47th of George the 3rd is unimportant?—Yes; the main purpose of it is to extend the jurisdiction of the Commissions to a certain water-course which divides Chelsea from Fulham; because it was not included in the former Commission; in the former Commission it was not within two miles, or something of that kind, of the metropolis.

2562. Now the next is the 52nd of George the Third, which is again purely formal?—Yes.

2563. Then comes the General Sewers Act of the 3rd & 4th of William the 4th, chapter 22?—Yes.

2564. And that, again, introduces no material alteration in the existing state of things?—No; but there are some important sections in it.

2565. As the 3rd and 4th of William the 4th was incorporated in the 10th and 11th of Victoria, the Act which comes next, perhaps it would be best to consider those sections under that Act; the 10th & 11th of Victoria was a Consolidation Act, and incorporated the General Sewers Act?—It incorporated the General Sewers Act; the date of the 10th & 11th Victoria is 1847, and the date of the 3rd & 4th William the Fourth is 1833.

2566. When I say incorporated the General Sewers Act, I believe it did not incorporate the principle entirely, but to a very large extent?—Yes, very largely indeed.

2567. What particular provisions do you wish to call attention to?—There is the description of the works which is under the jurisdiction of the Commission, that “all wells, banks, and culverts and other defences whatsoever, whether natural or artificial, situate or being by the coasts of the sea, and all rivers, streams, sewers, and watercourses which now are or hereafter shall or may be navigable, or in which the tide now does or hereafter shall or may ebb and flow.” Those are the words inserted in that clause, but the later Act leaves them out; the Act of 1847 leaves those words out, about “navigable,” and puts into the Preamble of the Act words which cover it.

2568. Coming to the 11th & 12th Victoria, that I believe again was a second Consolidation Act?—Yes.

2569. That, I believe, is the one constituting the Metropolitan Commission of Sewers?—May I read the words at the end of the Preamble, because it mentions what Mr. Pember referred to? The end of the Preamble is, “No place or part comprised within such limits” (*described in the Preamble*) “shall be exempt from the jurisdiction of the Commissioners by reason of the same being extra parochial, or being beyond the ebb or flow of the tide, or by reason of any other exemption or supposed exemption from the general law of sewers previously to the passing of this Act.”

2570. I want to call attention to Section 13, with regard to the principle that the tax is still to be a landlord's tax, and not a tenant's tax?—Not Clause 13; Clause 13 is with reference to the appointment of Chairman. The 38th Clause is word for word the same as the 69th Section in the Metropolitan Local Management Act, which is the main subject of this Bill; namely, the extension of the powers of that Bill, “and be it enacted, that the Commissioners shall from time to time repair the sewers which shall be from time vested in them or such of them as shall not be discontinued, closed up, or destroyed under the powers herein contained, and shall cause to be made such sewers and works, or such diversions or alterations of sewers and works as may be necessary for effectually draining the area within the limits of the commission, and shall cause any banks or defences abutting on any river, stream, canal, or watercourse to be raised, strengthened, or altered where it may be necessary so to do, for effectually draining or protecting from floods or inundation such area.” The preamble to the Bill relieving the former Act from the words respecting the ebb and flow of the tide makes the word “river” there certainly very plainly include the River Thames, or any other river that there might be in the metropolis.

2571. I believe the only distinction between that section which you have just read and Section 69 in the principal Act is, that in the Act before you the expression “vestries and district boards” is in place of the word “Commissioners”?—Yes.

2572. Then I may take it that with that exception Section 69 in the principal Act is taken verbatim from Section 38 of the 11 & 12 Vict.?—Yes.

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2573. And

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2573. And the word "river" here, is not in any way in the 11 & 12 Vict. fettered or qualified by the word "tidal" being omitted?—No.

2574. Just to preserve the sequence; the 12 & 13 Vict., Local and Personal Act, was the next. Is there anything in Section 38 which you wish to read?—There are the Monetary Clauses in this Act, and the 69th Section.

2575. What is the effect of the clauses?—They simply declare that the incidents of the cost of all the works done shall be precisely the same as in the Metropolis Local Management Act; that is, to be made by a rate payable by the owner in contradistinction to the occupier; it may be raised from the occupier, but the occupier can deduct it from the rent.

2576. Mr. Pember.] The incidence of taxation would be altered from the Level to the district?—No, this Act is very clear as to making the charge leviable; there is power to assess it as the Commissioners think fit.

2577. The next is the 12 & 13 Vict., Local and Personal; then 14 & 15 Vict., also Local and Personal?—Yes.

2578. Then comes the principal Act, the 18 & 19 Vict. c. 120?—Yes, that is the Metropolis Local Management Act.

2579. Under which the Board obtains existence?—Yes.

2580. You have already told us that the provision of Section 69 was found in a previously existing statute?—Yes.

2581. The 159th section enabled any vestry or district board to apportion the cost of doing the work upon any part of their district which they themselves benefited?—Yes, it is better that I should read that: "Where it appears to any vestry or district board that all or any part of the expenses for defraying which any sum is by such vestry or board ordered to be levied as aforesaid, have or has been incurred for the special benefit of any particular part of their parish or district, or otherwise have or has not been incurred for the equal benefit of the whole of their parish or district, such vestry or board may by such order direct the sum or sums necessary for defraying such expenses, or any part thereof, to be levied in such manner, or exempt any part of such parish or district from the levy, or require a less rate to be levied thereon, as the circumstance of the case may require, any such board may refrain, where any entire parish ought in their judgment to be so exempt, from issuing an order for levying any money thereon, notwithstanding they may issue an order or orders for levying sums upon any other parish or parishes in their district." That is practically giving to district boards the same powers that have been in force by the Commissions that were severally issued from time to time.

2582. Have those powers been preserved and continued in Clause 16 of the Bill now before the Committee?—They have so.

2583. Before I go more particularly into the provisions of that Act, the 21st & 22nd Vict. was the next Act which Parliament passed, being the Main Drainage Act?—Yes.

2584. Then the 24th & 25th Vict.?—The 24th & 25th Vict. was the next, that is the Drainage of Lands Act, but does not apply to the metropolis.

2585. I believe Section 33 of that enables the Commissioners to act without a jury?—It does so. "Commissioners of Sewers acting within their jurisdiction may without the presentment of a jury make any order in respect of the execution of any work, the levying of any rate, or doing any act which they might but for this section have made with such presentment, subject to this proviso, that any person aggrieved by any such Order made by the Commissioners without the presentment of a jury may appeal therefrom in manner hereinafter mentioned."

2586. The Commissioners of Sewers, under the Land Drainage Act, got rid of the usual presentment of a jury which was necessary under a previous Act?—Yes, but that was outside the metropolis.

2587. Then Clause 38 has some later provisions?—It merely contains the same principle of incidence which existed in the former Acts, and requires that the special rate shall be deemed to be a tax on the owner of property. Then it goes on in the next sub-section: "Where the owner of any land makes default in paying the amount of any rate due from him, such amount may be levied upon, and payment thereof enforced against the occupier of such land, and his goods and chattels in like manner, as if the same were a rate due from such occupier, with this limitation, that no occupier shall be liable to pay on account of any owner any sum exceeding the rent due, or that may accrue due to such owner

owner during the period of his occupancy; and subject to this proviso, that any occupier may, in the absence of any agreement to the contrary, deduct the sum so paid by him from any rent due or to accrue due to such owner; and the receipt of the Commissioners for any rate paid by the occupier under the circumstances mentioned in this section shall, to the extent of the monies therein expressed to be paid be a discharge as against such owner of an equivalent amount of rent."

2588. The next Act was the 25th & 26th Vict., the Metropolis Management Amendment Act?—Yes.

2589. It includes various Acts passed from time to time?—Yes.

2590. Beginning with a general question; from the first Act which I suggested to you, namely, the 23rd of Henry 8th, down to the last that I have referred to, has not the same principle as regards the incidence of taxation been preserved throughout?—All throughout, without exception, the principle has been that the place and property benefited shall contribute to the cost of providing that benefit, and that the owner of the property shall be called upon to pay, but that the tenants shall be made primarily to pay, with power to them to deduct it from the owner.

2591. And to make the incidence of taxation fall in any different way would be introducing a new principle of legislation?—An entirely new principle of legislation altogether.

2592. Now, coming particularly to Sections 69 and 70, which, of course, concern you as a member of the Greenwich District Board, I ask you, first of all, whether the liability to prevent floodings is not *prima facie* thrown upon you?—I am a member of the Greenwich District Board, and we have been advised by the legal advisers, that the responsibility of maintaining the river wall that protects a large part of Greenwich from the overflow of the Thames, was a burden of responsibility that fell upon us after the Metropolitan Commissioners of Sewers had ceased to exist; and we consequently have undertaken that duty, and from time to time we have carried out those clauses which I have read; that is the 69th and 70th sections, and the 159th section as well, and have assessed the expense incurred according to what we believe to be the area benefited.

2593. That is to say, under the 159th section already referred to?—Yes; I have a copy of the minutes of the District Board and of the vestry of the parish of Greenwich with me.

2594. You stated that you had carried out the provisions contained in the 69th and 70th sections, and upon that point I want to ask you what is the difficulty that you have experienced as to that sub-section?—Practically speaking, no difficulty at all, excepting that difficulty which seems always to arise with legal advisers in establishing anything new. I may say that the commencement of our proceedings at the Greenwich District Board upon this matter was on the 25th day of November 1857, when I as a member of the board moved, "That whereas certain sums have been expended in repairing, maintaining, and cleaning the ditches or drains, and the river wall in or surrounding certain lands and buildings situate in the parish of Greenwich, and known as the Greenwich Marshes, and which sums have been incurred for the special benefit of the said land or buildings; and whereas, by the 159th section of the Metropolis Local Management Act, any district board of works may order to be levied upon any particular part of any district the whole or any part of any sum which may appear to such board to have been incurred for the special benefit of any such part, the clerk be therefore directed to make a return to this Board of the sums so expended since the 25th of March last, with a view to the making an order for payment of the sums so expended. And such motion having been put to a show of hands, was carried in the affirmative. It was then resolved, That the subject of the foregoing resolution be referred to the Finance Committee with the assistance of the clerk to report what steps will be proper to be taken in relation thereto." That took place on the 25th of November 1857, but before the Board got that report, the 25th of July 1860 had come, from the difficulty of getting some of the legal advisers to put in force the powers which had never been in force before. Then the report of the Finance Committee came up: "The Finance Committee recommend, in accordance with a previous resolution of the Board, that inasmuch as a sum of 256 l., part of a large amount incurred for defraying the

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expenses of repairing and maintaining the river wall adjoining the marshes in the parish of Greenwich, has been expended for the special benefit of a particular part of the district, namely, that part of the parish of Greenwich in this district which is bounded on the north and west by the River Thames, on the south by certain land and premises in the occupation of Messrs. Mowlem & Company and others, and certain public highways called Hatcliffe-street, North, and the Greenwich and Woolwich Lower Turnpike Road, an order be made on the overseers of the poor of the parish of Greenwich, directing that the said sum of 256 *l.* may be levied on that part of the said parish of Greenwich within the limits aforesaid." That was resolved, and the order was so made and sealed with the common seal of the Board, and it was then sent down to the vestry of the parish of Greenwich, who are the overseers under the Local Act; and by the proceedings and minutes of the vestry, of which I have the minutes, I find: "Read letter from the clerk to the Greenwich District Board of Works, a copy of which follows." It was dated the 27th of July 1860. "Gentlemen,—With reference to an order from the Board of Works for the Greenwich District, accompanying this letter, I beg to inform you that the attention of the Board having been specially drawn to the expenses occasioned by the necessary repairs and maintenance of the river wall adjoining the Greenwich Marshes by which the land and property on the bank of the river and in the marshes are protected from inundation, the Board (taking into consideration the fact that for many years, until the passing of the Metropolis Local Management Act, it was the practice of the Commissioners of Sewers to make a sewers rate, called a "Wallscot," on the property in the Greenwich Marshes for defraying the costs of repairing and maintaining the marsh wall) referred the subject to a committee of their body, upon whose report of the amount of expenses incurred, and that the owners of land, &c., in the marshes ought to contribute in the proportion of 75 *l.* per cent. to such expenses in respect of the special benefit derived by them from the repairs and works above mentioned, the Board came to the determination that an order should be made on the overseers and vestry of Greenwich for levying and paying over to the treasurer of the Board a sum of 256 *l.* for defraying part of the expenses incurred for the maintenance of the river wall; and that the overseers should, in accordance with the provisions of the Metropolis Local Management Act, be directed to levy such amount in that particular part of the parish of Greenwich called the Marshes, which was considered to be specially benefited by such expenses, and an order has therefore been made and transmitted to you accordingly." That is from the clerk to the Greenwich Board to the vestry clerk of the parish of Greenwich. That is entered, and a rate is made for the 256 *l.*, at 1 *s.* 8 *d.* in the pound, on that part of the parish particularly mentioned and referred to in the order of the Greenwich District Board of Works. Then the next thing is this. There was another order of the same kind made on the 13th day of November 1861, to raise a further sum of 602 *l.* 15 *s.* 6 *d.*, on the same area of benefit, and that went down to the vestry, and when it came to the vestry they were evidently very disinclined to make the rate, and they negatived it. A letter was written by the Greenwich District Board to the vestry, inquiring what had been done with their order to raise the rate, and another meeting of the vestry was held, and the rate was made, and the rate that was made for this other sum of 602 *l.* was 3 *s.* in the pound on the area.

2595. The effect of those proceedings that you have just read, is to show that your district board has put in force the provisions of the 69th and 70th sections, and has authorised the rate, and it has been paid?—Yes, and it might be put in force in every district of the metropolis equally well.

2596. The works have been done by the parties themselves, and it has not become necessary for the vestry to enter and execute them for them?—No; these were the works done by the Greenwich District Board on the river wall, and the cost incurred was assessed upon the owners of the property upon that particular area determined by the board to be the area benefited.

2597. If you have found the provisions workable, what, in your opinion, renders the present legislation necessary?—Because, as we are informed by almost every district board and vestry that is represented in this Committee to-day, they have been unable to carry out the provisions of that 69th section on private property. I think I am right in saying that every one of the parishes now represented

represented by the learned counsel have memorialised the Board, specially to apply to Parliament.

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2598. Mr. *Littler*.] I should like to have our memorial; I do not want to have it read, unless it is material; but I should like to see it; the memorial of Lambeth?—I think nearly every one of the parishes represented here have memorialised the Metropolitan Board to apply to Parliament to extend the powers of the 69th and 70th sections of the Act.

Mr. *Littler*.] If the memorial is to be used at all, I must see what is in it; it will speak for itself.

Mr. *Armstrong*.] We never sent any such memorial in.

2599. Mr. *Bazalgette*.] I had better put the memorials to you first; you are asked for the memorial from Limehouse, and the one also from St. Olave's?—Limehouse is the first one. "Gentlemen,—I am directed by the Board of Works for the Limehouse district to call the attention of the Metropolitan Board of Works to the serious, and in some instances fatal, consequences which have arisen from time to time at the waterside part of the metropolis, in consequence of the extraordinary high tides which occasionally occur. The inundation caused by the overflow of the river, on the 20th instant, was productive of great loss and destruction of property in certain parts of this district adjacent to the river, and this board feels the necessity for some prompt measures being adopted to avert the recurrence of so disastrous an event in future. It does not appear that anything effectual can be done without the intervention of Parliament, and, therefore, this board would suggest that the Metropolitan Board should give the matter their serious consideration as to the propriety of obtaining Parliamentary powers for dealing with the question."

2600. What is the date of that?—The 31st of March 1874.

2601. Now look at the 7th of May 1874, when there is a further representation from the Limehouse District Board of Works upon the same subject:—There is one comes in between from St. Saviour's. On the 8th of May we received another letter from the Limehouse District Board. "Dear Sir,—I am directed by the Board of Works for the Limehouse district to acknowledge the receipt of your letter of the 17th April last, having reference to the recent flooding of some of the low-lying districts of the metropolis on the banks of the Thames, and calling the attention of the Board to the 69th section of the Metropolis Local Management Act, 1855, which provides, 'That every vestry and district board shall cause all banks, wharves, docks, and defences abutting on or adjoining any river, stream, canal, pond, or watercourse in such parish or district to be raised, strengthened, altered, or repaired, where it may be necessary so to do, for effectually draining or protecting from floods or inundations such parish or district.' In reply, I am directed to inform the Metropolitan Board that all the public approaches to the river in this district have been raised to a level sufficient to prevent inundation, but the district board is of opinion that there are serious difficulties against proceeding to enter upon private property to raise the frontages of wharves abutting on the river. Many questions would arise; among others, that as to compensation for damage. It appears to this board that further legislative authority is necessary to deal with the question, as the owners of wharves requiring to be raised to prevent inundation should be liable to defray the costs and expenses incurred by the district board in performing the work, and the district board should be indemnified against consequential damages. The district board feel the great importance of the question being taken up without a moment's delay, for the evil consequences arising from the late inundation are very serious, not only in this district, but in the other riverside districts of the metropolis, and I am directed to urge the Metropolitan Board to take the steps necessary, either to promote a Bill in Parliament for the purpose, or to get introduced into the Bill they now have before the House of Commons power for the district boards to require the owners of all wharves to raise them a sufficient height to keep out the highest tides, and in the event of their neglect or refusal so to do, that the district boards may enter and perform the works, and recover the expenses, and that such expenses be made a charge upon the property." That is addressed to Mr. Wakefield, the clerk of the Board, and is dated the 7th of May 1874.

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2602. Is not the basis of that representation which urged immediate legislation with regard to this matter contained in the second paragraph of that letter which you have before you, which states, "That although public approaches have been raised to a level sufficient to prevent inundation, there are serious difficulties against proceeding to enter upon private property to raise the frontages and wharves abutting on the river"?—That is generally understood to be the real difficulty which has prevented the different boards and vestries of the metropolis from putting in force the 59th section.

2603. Mr. Pember.] And your Section 12 of the Bill meets that?—Yes, it is intended to meet it, and yet it is opposed.

2604. Mr. Bazalgette.] Take one more as a fair representation; that which we have received from St. Saviour's, dated the 30th of July 1874?—The letter is addressed to Mr. Wakefield from the St. Saviour's District Board of Works. "Sir,—The board of works for this district have had under their anxious consideration the question of the tidal overflow of the River Thames in the month of March last, and the means of preventing the recurrence of such a calamity, and also of the powers of vestries and district boards of works under the 69th section of the Metropolis Local Management Act, 1855, to which their attention was called by the circular from the Metropolitan Board of Works, dated 17th April last, and they feel considerable doubt whether under that section any vestry or board of works have the power either of compelling the owners of wharves and premises having a frontage to the river to raise their river walls, or to enter upon such wharves or premises against the will of such owners for the purpose of heightening such walls; and they are also of opinion that if they did attempt to carry out the works at the expense of the district, a serious question would arise as to the right of the owners of wharves, &c., to receive compensation for any loss, inconvenience, or injury, they might sustain thereby. Under these circumstances, I am instructed by this board to apply to your honourable Board for an expression of their opinion as to the powers, rights, and duties of the district board of works under the above 69th section.

2605. Again, in that representation of St. Saviour's, the same great difficulty of entry upon private property is pointed out?—It is so; the difficulty of carrying out the 69th section by the failure of entry upon the premises and giving compensation.

2606. I refer to these words, "or enter upon such wharves or premises against the will of such owners, and for the purpose of heightening such walls"?—Yes. Then there is an answer to that letter.

2607. To revert to your former answer: it was such representations as these that led the Metropolitan Board of Works to the conclusion that new legislation was required for the purpose of strengthening the 69th and 70th sections?—It was so.

2608. You have called attention to the 159th section, which enables the district boards to place the cost of doing the work upon the portion of the area that they consider to be benefited?—I have.

2609. Prior to the passing of the Metropolis Local Management Act, the cost of repair and maintenance of river walls within your district was met by a wallscot?—It was met by a wallscot of the late Commissioners of Sewers; that is, after the jury had found the presentment.

2610. That wallscot was levied upon the same principle that has been adhered to here, namely, the area benefited?—Precisely so. I do not mean to say that it was levied on precisely the same area, because we could not find out the particular area that the wallscot ran over; but we instructed our own engineer upon that occasion to state what area he considered to be the area benefited, and the board acted upon his advice in the matter. I should make a slight alteration in what I stated as to the proceedings of the Greenwich District Board upon that matter, namely, that, instead of raising the whole money so expended, they threw 25 per cent. of the money expended on the river wall upon the parish, and they raised 75 per cent. of it upon the area benefited.

2611. I believe that adjacent to the Greenwich district there are some parishes within the metropolis which are included in one of the old Commissions?—Yes; the parishes immediately adjoining Greenwich, from Lombard's Wall down to Gravesend, are included in another sewerage district; and they also had for years and years, I may say for centuries, had their river wall repaired by

by the same principle of a wallscott; and I have been told that rates have been made from time to time of a very severe kind to compass that.

2612. Now the Metropolitan Board of Works has property at Crossness and Abbey Mills, which falls within the jurisdiction of one of these Commissions, and the Metropolitan Board of Works have, in their turn, paid the wallscott?—Yes; that is the Dagenham, and another Commission there is one running from Bow Creek past the Dagenham parish, and it deals with the whole of the property and a large portion inland, and deals with it upon precisely the same terms.

2613. Look at that Paper, and tell me whether it represents the amount paid by the Metropolitan Board of Works to these Commissions, by way of wallscott, within the present year (*handing a Paper to the Witness*):—This is a letter dated the 2nd January 1877, addressed to the secretary of the Metropolitan Board of Works, by Mr. Williams, senior, collector: "Sir,—I beg on the other side to send an account of the wallscott due from you in respect of land in your occupation, which was served on the 1st day of December last, and as it is essential that I should collect it as early as possible, I shall feel obliged if you will kindly forward me a cheque for the amount at your earliest convenience." Then there is a cheque for 9 l. 17 s. 1 d. for wallscott upon 35 acres, 3 roods, 14 perches, in the Abbey Level, at the rate of 5 s. 6 d. per acre.

2614. Upon the opposite side of the Thames are there similar parishes within the metropolis which are under the jurisdiction of the Commissioners, and which in their turn have to pay wallscott?—Only a part of the parish of North Woolwich. North Woolwich has two little pieces, both of which are on the north side of the Thames, and are in that Level.

2615. In your opinion, should the same principle be carried out in other places within the metropolis, which prevails in these districts which pay this wallscott. Should this principle of wallscott, which prevails in certain parts of the metropolis, be extended to other parts of the metropolis which it does not now extend to?—The principle should be extended, but I would rather contend that it is extended by the Metropolis Local Management Act if the vestries and district boards choose to put it in force.

2616. As to costs, which may be levied at any time by the vestries in pursuance of the 69th and 70th sections, are they raised under the form of a sewers rate?—They are raised by a sewers rate by the 68th section of the Act.

2617. Is the sewers rate a rate levied on the landlord, or in case it is levied upon the tenant, has he power to deduct the amount from the rent payable?—It is by special statute a landlord's rate, and on every notice served by the parish to an individual to pay sewers rate, it is necessary to put at the bottom of it: "This rate may be deducted from the landlord in any rent that has to be paid to him," and a notice is not a legal notice, unless it bears words to that effect.

2618. And the present Bill still preserves that tax as a landlord's tax?—The money is to be raised under the present Bill, if passed, as a sewers rate.

2619. In a large portion of your district which lies very high, people could not in any sense be benefited by the prevention of floods in the lower part?—A portion of the parish of Greenwich must be nearly 300 feet above the level of the River Thames at high water, and could by no possibility be benefited. So it is in other parishes in the metropolis; in none more so than Lambeth. The whole of Norwood is in Lambeth parish, which could by no possibility be benefited by the expenditure of money on the low-lying lands immediately abutting upon the Thames.

2620. Does the same thing apply to the district of Lambeth and the other districts represented here?—To most of the other places except St. Saviour's, Southwark, and those very closely abutting upon the river.

2621. In your opinion, is there any parity or comparison between the works executed by the Metropolitan Board, such as the embankment of the Thames and main drainage works, and the works under the proposed Bill?—There can be none whatever between them. The works done by the Metropolitan Board in the embankment of the River Thames were works mainly for the purpose of large improvements in the metropolis, and to make the metropolis of London a city that would compete and compare with cities on the Continent, and it has nothing to do with the main drainage and other questions. It was so arranged that the low-level sewer should pass through it, and be made available for that purpose, but it could have no connection with the question of tides or otherwise. The

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Thames Embankment and the Albert Embankment would never have been made with arches so as to allow the tide to flow through them to the back if they had been intended to protect the districts from floods from high tides. There is no case more patent than that of Lambeth, where there is a large parish drawdock, and where the Metropolitan Board were compelled to make a way under the embankment for the use of the parish to that dock; and that drawdock has been one of the main causes of the overflow of the Thames in the parish of Lambeth. The main part of the evil and suffering caused has been caused by the imperfect manner in which the parish of Lambeth has maintained that drawdock. They have allowed the water to flow over the road, and extend all over that part of the parish of Lambeth. The same thing existed as to the Thames Embankment upon the north side of the Thames. It was originally ordered to be constructed as an open embankment from the Temple to Blackfriars Bridge, and it was only ordered to be made a solid embankment for the purpose of the Metropolitan District Railway passing under it.

2622. I understand you to say that the primary object of the construction of the embankment was to give a street improvement?—A street improvement, and general improvement of the whole metropolis.

2623. Mr. *Locke*.] Who paid for it?—It was paid for by the coal dues.

2624. And what else?—Nothing else but the coal dues; the coal dues are paying for it now.

2625. Mr. *Bazalgette*.] The coal and wine dues?—Yes; the coal and wine dues; the latter are very trifling.

2626. And again, protection from flooding is hardly an advantage which is incident to the construction of an improved new thoroughfare?—It is incidental, but nothing more than incidental.

2627. I suppose if the construction of a work of that kind, without going to much more expenditure, would at the same time compass such protection, it would be an object, *pro tanto*?—Certainly; but to do it thoroughly you must interfere with the whole trade of the metropolis; if you do so, you do a great deal more evil than good.

2628. At the present time, the principle on which the Board proceeds in opening up arterial roads and thoroughfares, is to lay the tax upon the whole metropolis?—Yes; because it is a general improvement of the main arteries of the metropolis, and every parish ought to have the same benefit given to them at some time or the other. Nearly every parish in the metropolis, in soliciting the Board for improvements, uses the argument, You did it for this or that parish, now do it for us; and it is a solid argument, to which there is almost no answer.

2629. The river, and the various embankments, answer the description of main thoroughfares, and the tax would, in the ordinary course of things, fall upon the whole metropolis, even supposing no protection from flooding was given to those districts?—Yes.

2630. Does not the same reason apply to parks and open spaces?—Yes; they are available for any ratepayer of the metropolis who chooses to make use of them.

2631. Might I state that the principle of the Board of Works generally, is that a metropolitan improvement would be one which affords an accessible benefit to the whole of the metropolis?—Yes; and the difference between that and that which we are now considering, is that it is not accessible; it is only a benefit to the owners of the property affected by the works done.

2632. In some cases it might, as regards the different parts of the metropolis, be an approximate or a remote benefit, but it must be accessible?—Yes.

2633. Taking the case of work, under the present Bill, could they in any sense be said to afford a benefit which is accessible to the whole metropolis at large?—Certainly not; it is so much money spent for the benefit of certain land which has been for centuries subject to these continued floodings from the overflow of the Thames, and of course every little landlord will get the benefit of it. You are now asked to give us power to stop that overflow, and when that is stopped those lands will be of largely increased value. Therefore, the landlord of course will get the advantage of it, and he ought to pay for it.

2634. As an illustration of that, take the case of the Langham Hotel. The Langham Hotel was rated to the Thames Embankment?—Yes.

2635. And

2635. And in return for this rating, it would have a metropolitan street improvement accessible to it if it chose to use it?—Yes.

2636. In addition to that, so far as the main drainage is concerned, it has the means of drainage available to it?—Yes.

2637. Supposing it was proposed that the Langham Hotel should be rated to the works proposed under the Bill, could it on any grounds be said to be any benefit, either accessible or available to it?—Certainly not; but there is one little infirmity in the way in which you put it, to which the attention of the Committee should be called, and that is this, that unless the Langham Hotel happened to be owners of their property they would not be called upon to contribute at all; the principle of this is, that the incidence falls upon owners, and not occupiers.

2638. I do not know that I have anything else to ask you, but I will repeat the question, whether this Bill has not been founded upon the principles of legislation existing up to the present time, and upon the principles which govern the Metropolitan Board of Works with reference to the execution of all their works in the whole of the metropolis?—It is founded upon the principles which we find established in the reign of Henry the 8th, which were continued down through the Metropolitan Local Management Act, and are still in force at the present time, and any variation from that principle would be an entire variation of the existing statute law.

Cross-examined by Mr. *Richards*.

2639. Amongst the several memorials you stated had been presented to the Metropolitan Board, I do not think you had any from the Conservators of the River Thames?—I do not remember one.

2640. Those gentlemen may be taken to perform what is imposed upon them by Act of Parliament, pretty well, may they not?—I suppose so; they complain sometimes.

2641. Are you aware whether the Metropolitan Board of Works are represented at all at the Conservancy Board?—No, they are not, but we think they ought to be.

2642. There have been some efforts made to obtain an ex-officio seat at the Conservancy Board?—Yes, we think we ought to be represented in that body.

2643. And probably on most bodies you think you ought to be represented?—No, I did not say that; I say upon your body.

2644. And the Conservancy Board take a different view?—I do not know what view they take, but I believe we have generally been opposed in Parliament by somebody.

2645. At all events you are not there at present?—No, but we shall be there before long. I think so.

2646. Probably this Bill might be a step towards it?—I do not know that. I do not know what that has to do with it.

2647. Have you any intention by this Bill to limit the rights and estate of the Thames Conservancy?—Certainly not.

2648. Mr. Roche seemed to say, certainly not, unless you found the necessity for it?—I do not think there is any power, or there are words in the Bill giving the Metropolitan Board power to go one inch in advance of any wharf that now exists.

2649. Take the 25th Clause of your Bill; should you be prepared to strike out the words at the end of the 25th Clause, beginning with "So far"?—That was the clause there was some discussion about when Mr. Roche was in the chair. I might say, upon the part of myself and most of my colleagues, that they would not mind expunging almost the whole of it.

2650. Clause 25 is said to preserve our rights?—No; the one we thought we might expunge from the Bill was another clause. I am not of sufficiently legal mind to judge of the words you ask to have struck out; that must be left to the Equity draftsman.

2651. Can you inform us whether the words do or not impose a limitation upon the Conservators' present rights?—"Nothing in this Act contained shall extend or be construed to extend to prejudice or derogate from the rights of the

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Conservators of the River Thames, or to prohibit, defeat, alter, or diminish any power, authority, or jurisdiction which, at the time of the passing of this Act, the said Conservators did or might lawfully claim, use, or exercise, so far as such rights, power, authority, or jurisdiction may be exercised for the preserving of the free navigation of the River Thames."

2652. You will agree that those words commencing with "so far," limit the operation of the clause to so far as it may affect the navigation of the River Thames?—I would suppose that the rights of the Conservancy were limited to preserving the free navigation of the River Thames.

2653. If the rights of Conservancy under their Act are not limited to that, does this interfere with their rights?—That is a question for the Equity draughtsman, not for me.

2654. Upon one or two occasions we have had Clause 29 of the 21 & 22 Vict. c. 104; the Act of 1858. My learned friend Mr. Cripps has pointed out that the words of that clause are identical with the words of Clause 25 in your present Bill?—I do not think I have the 21 & 22 Vict. with me.

2655. The Main Drainage Act?—You mean the 19 & 20 Vict.

2656. You may take it from me that the words are identical. The Main Drainage Act was passed in 1858?—The first Main Drainage Act was passed in 1855, and came into operation, 1st of January 1856.

2657. Twenty-one and twenty-two Vict. c. 104, was passed in 1858?—Yes.

2658. I daresay you are aware that the Act under which the Thames Conservators are invested with their present rights and estate was passed in 1857?—I was not aware of that.

2659. Therefore the Act of 1858 was passed immediately after the creation of the Thames Conservancy Board?—Yes.

2660. And are you aware that in Acts subsequent to the 21 & 22 Vict., no such limitation as conveyed in the words "so far," as to the navigation of the Thames, occur?—I was not aware of that, but I will take it from you if you say so. I may add there is no intention on the part of the Metropolitan Board to limit the power of the Conservancy in any way. I can repeat what Mr. Roche said, that if there is any question of that kind existing, if you send a clause to the Board they will consider it.

2661. You repeat the words of Sir Joseph Bazalgette, not Mr. Roche?—I can only say that it will be fully considered.

2662. We are quite prepared to offer the clauses if you like to have them?—Very well.

Cross-examined by Mr. Littler.

2663. I am not going to take you through your Act of Henry 8th, but let me draw attention to one thing, which is a thing to be done by a jury, and not by the Commissioners: "Secondly, if any wall, bank, river, sewer, or other defence, be defected, by neglect or sufferance of such as should repair the same, the Commissioners of Sewers are to inquire by jury in whose default the same happened?—Yes.

2664. You are also aware that the Commissioners of Sewers with all their taxes and everything else are under the control of the Court of Queen's Bench?—I cannot say that I know all the law bearing upon the question.

2665. "But their conduct is under the control of the Court of Queen's Bench, which will prevent or punish any illegal or tyrannical proceedings; and yet in the reign of King James the First (8th November 1616), the Privy Council took upon them to order, that no action or complaint should be prosecuted against the Commissioners unless before that Board, and committed several to prison who had brought such actions at common law till they should release the same; and one of the persons, for discharging Sir Edward Coke from his office of 'Lord Chief Justice, was for countenancing those legal proceedings; the pretence for which arbitrary measure was no other than the tyrant's plea of the necessity of unlimited powers in works of evident utility to the public, the supreme reason above all reasons, which is the salvation of the King's lands and people'"?—There is a vast difference between the two things. First, we have before us that every Commission of Sewers appointed, other than that referred to, has a full power

power to act, without any control over it whatsoever; and then we have the Metropolitan Commissioners of Sewers under a certain control, and then you compare that with the Metropolitan Board of Works, which is a representative body elected by the persons themselves who are to be benefited by the works, and because they are a representative body, the Legislature has granted them full powers of action.

2666. Is it your notion that the Commissioners of Sewers are irresponsible?—I mean to say that the difference between the Commissioners of Sewers and the Metropolitan Board of Works is sufficient to justify an alteration in the Statute, because the Metropolitan Board of Works are a representative body.

2667. Do not you know that all the proceedings till the time of the Metropolitan Board of Works were almost removeable by certiorari?—I do not know that.

2668. You have been talking about various Acts of Parliament, and you say that you have not a sufficiently legal mind; what are you, a lawyer?—No.

2669. What are you?—A private individual.

2670. I need not trouble you with anything about Acts of Parliament, but I will trouble you with a question addressed to the history of the 26 & 27 Vict. c. 102, which you did not think it convenient to mention. I will read a note of Mr. Woolrych's history of that Statute, page 240 of my edition; it is the note to the first clause; the marginal note of the clause is, "Debt in respect of Counter Creek works, and part of debt in respect of Ravensbourne works, redistributed and made payable out of monies borrowed on the security of the main drainage rate"?—Yes.

2671. Will you listen to the account given of the history of that legislation in Woolrych's note: "The 181st Section of the Local Management Act (18 & 19 Vict. c. 120) ante, continues the debts and liabilities of the Metropolitan Commissioners of Sewers a charge upon those districts or parts in which rates would have been levied to meet them in case that Act had continued in force, and direct that the sums becoming payable under, or required for payment of such debts and liabilities, should be raised in like manner as the expenses of the Board in execution of that Act; and with respect to districts or parts beyond the limits of the metropolis as defined by the same Act, it directs that precepts shall be issued to the overseers of the parishes in which any part within the limits of the parts is comprised, requiring payment of the sums necessary to be raised in such parts. The debts enumerated in the First Schedule to this Act were charged by the Metropolitan Commissioners of Sewers previously to the determination of the Commissioners on certain sewerage districts on levels included within the limits subject to their jurisdiction. These district or levels were formed with regard to the fall of the ground, the main lines of sewers and other natural conditions, and they had no reference to the division according to parishes and districts forming the basis of the Metropolis Local Management Act. As the monies required for payment of the former debts had, under the provisions of the last-named Act, to be raised in parishes or parts of parishes, it became necessary that the Metropolitan Board should apportion those debts among the parishes and parts of parishes constituting the former sewerage district or levels. This they did in the proportion of the rateable value of the property in the respective parishes and parts of parishes, and except so far as concerns that portion of the debts referred to in Schedule (A.) to this Act, which is dealt with by this section, the distribution or apportionment so made by the Board is still in force; the re-apportionment directed by this section is not to affect the validity of any precepts already issued. The Bill for amending the Metropolis Local Management Act, when first introduced by the Metropolitan Board, contained a clause by which it was intended to redistribute certain other portions of the debts included in the Schedule referred to, and to alter the amount charged upon certain parishes and parts of parishes. The principle on which the Board proposed to proceed was to apportion the debts according to the benefit actually conferred upon parishes, &c. by the works in respect of which they were contracted, so far as it could then be ascertained by an investigation of their locality, nature, and cost, the special Committee of the House of Commons which sat upon the Bill having had conflicting evidence before them, were not satisfied of the propriety of the proposed re-apportionment, and the clause was ultimately excluded from the Bill. The present section deals

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specialty with two sums, one of 43,721 *l.* 15 *s.*, the cost of the Counter's Creek works, and the other 10,000 *l.*, a portion of the cost of the Ravensbourne works; and regarding them as having been designed and executed to the extent expressed in the clause as for the benefit, not of particular localities, but of the metropolis at large, it directs that the debts incurred on account of them shall be discharged out of the monies raised under the Main Drainage Act (21 & 22 Vict. c. 104), instead of continuing them as a charge on individual districts; some of the parishes mentioned in the clause are without the limits of the metropolis as at present defined, *i.e.*, Willesden, Acton," and so on?—You have not put any question upon that.

2672. I drew your attention to it being there?—I do not see how it bears upon the question in any way.

2673. I ask you how it was that you passed over that 25 & 26 Vict.; your answer is, that it does not bear?—I will draw attention to the 170th section of the first Act; you will find there that the 18 & 19 Vict., which was passed before the Metropolitan Board of Works was in existence, and was brought in by the late Sir Benjamin Hall, required the Metropolitan Board of Works, when it was established, to assess all their expenditure, first of all having regard to the annual value of the property in the several parts of the metropolis, and then having regard, in the case of expenditure on works of drainage, to the benefit derived from such expenditure by the several parts of the metropolis affected thereby. That was an absolute power given to the Metropolitan Board under the original Act. But, then, when it came into operation under the 25 & 26 Vict., the Metropolitan Board of Works initiating this second statute, finding that there were great difficulties in carrying out works of main drainage, because main drainage was so clearly for the benefit of the whole metropolis, asked Parliament to vary that power, and it was varied.

2674. It was what they did not ask Parliament to do, but Parliament did against their will?—We asked Parliament to throw it on the whole of the metropolis, because it was impossible for the Metropolitan Board of Works to throw it upon parts of the metropolis, and divide it.

2675. Then Mr. Woolrych's note is wrong?—No, you confound the two things. Mr. Woolrych's note refers to portions of the late debt of the Commissioners of Sewers, which had been unfairly assessed in the two districts; the Metropolitan Board of Works applied again then to Parliament to allow them to vary that incidence of charge, and they did vary the incidence accordingly.

2676. You say that in every case where the metropolis is rated it should be for something accessible to the whole metropolis?—Yes.

2677. That is your distinction?—Yes,

2678. How does the Langham Hotel get access to the southern drainage system?—Not to the southern drainage system, but the southern drainage system pays for the northern drainage system, and, *pari passu*, the Langham Hotel must pay its share of the southern drainage system.

2679. Has the Langham Hotel access to the southern drainage system?—No more than any hotel on the south has access to the northern drainage.

2680. Is it accessible at all?—No, it is not.

2681. I think you were examined before the Toll Bridges Committee last year, were not you, with reference to the Creek Bridge?—Yes, at Deptford.

2682. I find you said this in answer to Question 1034, in which you were asked whether the tolls were increasing: "They have not been increasing much; it is a dead-and-alive neighbourhood on account of this toll bridge, and every advance seems to be stopped. (Q.) That is owing to its being a toll bridge? (A.) No doubt it would be a great advantage to the district of the metropolis in which the bridge is situated to free the bridge; it is a poor man's question; the district is inhabited by poor people;" the districts flooded are chiefly inhabited by poor people?—They are so.

2683. You sought to make the Creek Bridge a metropolitan charge?—I did so because the parishes of Greenwich and Deptford were to be assessed and made to pay the cost of redeeming the tolls of Waterloo Bridge, and all the other bridges in the metropolis, and if we were to pay for them they must pay for the redemption of ours.

2684. Waterloo Bridge was not proposed to be redeemed in this Bill?—Yes, in

in the same Bill ; I said if they pay for these bridges they must pay for ours ; the argument is sound enough.

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2685. This is the next answer : " Our bridge, I do not hesitate to say, is very largely a local question and a local difficulty, but inasmuch as I have said before, we who are in the metropolis portion of Kent pay a third of the whole county rates of Kent ; why should not the rest of the county of Kent help to redeem this bridge as well as ourselves " ?—That was my opinion.

2686. Was it accessible to the county ?—Quite as accessible to the rest of the county if they chose to come over the bridge.

2687. In the same sense as it was accessible to Edinburgh or Glasgow ?—Yes ; but these lands are not accessible to everybody, because there are private lands that you want to spend money upon, and charge to the metropolis.

2688. Then you think that these charges are local charges, and ought to be made so ?—The cost incurred ought to be assessed on the area they benefit.

2689. Then why do you take power in the Metropolitan Board of Works to contribute ?—Because there may be certain cases where it may be desirable in consequence of large expenditure to be incurred, that some portion might be charged upon the whole metropolis. Just on the same principle as the Greenwich District Board has had to assess 25 per cent. of the cost of maintaining the river wall upon the whole parish, and only put 75 per cent. upon the area benefited.

2690. I take it that as a rule you would take care that the Metropolitan Board do not contribute ?—I do not know why you should say that.

2691. Is it a power which you propose, as far as you are concerned, to put extensively in force, or is it an exceptional power ?—It is a power that the Metropolitan Board of Works ought to have.

2692. Is that an answer ; is this a power which you expect will be extensively used, or an exceptional power as far as your view is concerned, which you will not frequently use ?—Whether or not it would be frequently used can only be determined when the questions come before the Board.

2693. You cannot give me a notion whether you would contribute or not ?—No ; when the facts come before the Board I can judge whether they are such that any portion should be spread over the whole metropolis, or whether they should pay the whole of it.

2694. Then why do you say that it is a local and not a metropolitan improvement, when you do not know what the facts are ?—Because every expenditure of money for the purpose of preventing floods on the low-lying lands is for the special benefit of those low-lying lands, and therefore ought to be assessed upon them.

2695. Then the result would be that you would vote against any part of it being made a metropolitan charge ?—On principle I would.

2696. Then it would be an exceptional thing to vote any part charge ?—Yes.

2697. You say that you do not see any difficulty in the 69th and 70th sections being carried out ?—I am not a lawyer, and cannot deal with the question of power to enter upon other persons' lands, but excepting that, I can see no difficulty whatever.

2698. You have said already that it might have been put in force in every parish of the metropolis ?—Excepting for that difficulty.

2699. You do not allow that difficulty then ?—Yes, I do.

2700. Does that difficulty exist in your judgment, or not ?—I believe it does exist. I believe I am right in saying that no attempt has been made in any of the superior courts by mandamus to compel the owner of property to allow the vestry to go upon the land ; but all the legal advisers of the different boards and vestries have, as we understand, said, and certainly I may say my own legal adviser of the Greenwich District Board has told us that we have no power to enter upon the lands of private persons.

2701. You give the answers of several of the districts ; you did not give me Lambeth. Is this what Lambeth said as to the whole of this Bill ; it is the only memorial which we have sent ; the memorial of the Vestry of Lambeth ?—I have one dated the 19th November 1875. Mr. Deputy Robert Taylor handed in

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a letter which was read as follows: "The Vestry of the Parish of Lambeth, Vestry Hall, Kennington Green, S.E., 19th November 1875. Dear Sir,—I am instructed to forward you a copy of a resolution passed by this vestry, at a meeting held last night. Moved by Mr. Turner, seconded, and resolved, 'That the Metropolitan Board of Works be requested to put into immediate action the provisions of the Metropolis Management Act relating to raising wharfs and other walls along the riverside, with a view, if possible, to prevent the periodical inundations which the riverside parishes are subject to.'"

2702. Now let me draw attention to this, which is the only one I know of:—There may be others.

2703. I asked you some time ago to find them?—There are none before that time.

2704. Now listen to this: "Your memorialists have had under consideration the provisions of the Thames River (Prevention of Floods) Bill, which your honourable Board has resolved to submit to Parliament next Session; that the interests of the parishes and districts represented by your memorialists will be seriously injured if the said measure be allowed to become law in its present form, inasmuch as it proposes to cast upon the local authorities of the districts which abut upon the Thames the duty of raising the river banks and walls within the limits of their respective jurisdictions, so as to prevent in future any overflow of the river; that the River Thames being one of the principal features, and the most important highway of the metropolis, anything which relates to it is a matter of metropolitan interest; and that for this reason, as well as on account of the magnitude of the undertaking, the raising of the river walls and banks should be treated as a work of general importance, to be carried out by your honourable Board at the cost of the whole metropolis; that the Legislature, in entrusting to your honourable Board on several occasions the duty of embanking parts of the Thames, has recognised and affirmed the justice of this view; and that, as parts of the Thames have been embanked at the cost of the metropolis at large, it would be unjust to call upon the local bodies represented by your memorialists to do for those parts of the river upon which their districts abut what has been done for other parts at the general cost; that the burden would weigh with peculiar hardship upon some of the districts whose river frontage is extensive or lined with wharves or warehouses of great value; and that in some cases occupiers of property many miles from the Thames would be taxed for raising the river walls, whilst others very near the river would escape because their districts happen to have no river frontage; that from whatever point of view the proposal in the Bill is regarded, it will be seen to involve hardships and inequalities on the riverside districts, and that the only fair and satisfactory way of dealing with the question will be for your honourable House to undertake the work of preventing the overflow of the Thames at the cost of the whole metropolis"—I do not know that the facts are rightly stated: "That the interests of the parishes and districts represented by your memorialists will be seriously injured if the said measure be allowed to become law in its present form." I do not know who that means; whose interest would be injured.

2705. It speaks for itself?—No, it does not; it pretends to say that the interests of the ratepayers of the parish of Lambeth will be seriously injured, but there is no intention of throwing a shilling upon the ratepayers of Lambeth by this Bill.

2706. Is there not; upon whom is it to fall?—Upon the owners.

2707. Show me any single clause in the Bill which throws it upon the owners?—It makes it a sewers rate.

2708. How do you collect sewers rates?—Upon the owners.

2709. As part of the general metropolitan rate?—No, the owners pay it.

2710. Are you an occupier or owner yourself?—Both.

2711. Do you pay as occupier?—I pay the sewers rate as occupier.

2712. How can you tell me the sewers rate is thrown upon the owner?—Because I covenanted with my owner to pay it, and I pay a reduced rent.

2713. Do you know any other being in the metropolis who is an occupier and who does not pay a sewers rate?—Do you wish to convey to the Committee that in the time of Henry the 8th, when the sewers rate was made, it became not a charge upon the owner but a charge upon the occupier?

2714. You are not a lawyer but I am, and I am not here to answer your questions.



tions. I talk of sewers rate in the metropolis at present; is it not paid by the occupier as a rule?—It is not paid by the occupier as a rule, unless he has covenanted with his landlord that he was to pay it.

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2715. Do not you know, as a rule, it is paid by the occupier?—I know it is not paid by the occupier unless he has covenanted to pay it.

2716. What is the meaning of the clauses giving power to distribute it?—I do not know what you mean.

2717. Does not your own Bill say that the vestry are to distribute it over the district?—There is no such power; it is over the area benefited, not the district.

2718. It is your own 19th clause: "And in any case in which it shall appear to the Board that such expenses have been incurred for the special benefit of any particular part of such parish or district, or have not been incurred for the equal benefit of the whole of such parish or district, they may, by order, direct the vestry or district board, to cause the sum or sums necessary for defraying such expenses, or any part thereof, to be levied in such part, or exempt any part of such parish or district from the rates, or require a less rate to be levied thereon, as the circumstances of the case may require"?—That is for the purpose of requiring the owner of the property benefited to pay; the owner of the property not benefited should not be called upon to pay.

2719. There is nothing here about owner?—The whole principle of the Bill is that the owner shall have to pay.

2720. Take your own instance; you talk about having covenanted with your owner to pay sewers rate; that sewers rate is now to include a new charge?—Yes, I agree with you.

2721. Then you would be bound to pay, though it is a new charge put upon the sewers rate?—If I have entered into that covenant with my eyes open, I must take the burden.

2722. Were your eyes open to the fact that this Bill was to pass?—I knew it was a charge upon the owner; the Metropolitan Local Management Act makes it a charge.

2723. Do you know that the main drainage rate was a charge upon the owner, unless he covenanted out of it; but now you are going to add to it what many people have covenanted themselves out of, a further charge?—It is not a further charge; we ask the Legislature to give us power to carry it out.

2724. This is a new addition to the sewers rate, is it not?—No, it is chargeable by the 69th and 70th sections. By the 159th section it can be assessed upon the different parts of the district or parish; and by the Act of Parliament it is required to be raised as a sewers rate, and levied upon the owner, and not upon the occupier; and it is an owner's charge, and not an occupier's charge.

2725. Do you mean to say that the vestries do not make a rate when they get their precept for the main drainage upon the occupiers?—Yes, with the full instructions to the occupier that he can deduct it from the owner.

2726. If it is not paid, who is distrained upon?—The occupier.

2727. Now let me return to my point; you are asking for a new power, are you not?—No new power, except the power of entry on to the land, and the power for the Metropolitan Board of Works to contribute under certain circumstances.

2728. And the power to the Metropolitan Board of Works to order the vestry to do it, which you have no power to do now?—No.

2729. And you are going to confer a power upon the Metropolitan Board of Works to compel works to be done payable out of the sewers rates, which you have no power to do now?—For the benefit of the owners, who are to pay for it.

2730. That would be a liability to sewers rate, which does not now exist?—No, the liability exists in this Act at the present moment.

2731. You, no more than the other gentlemen, have considered the amount of compensation which it is likely to have to be paid?—No, I cannot say I have considered it; but it is a minor matter, because, supposing you have got a large compensation to fall upon a property particularly benefited, if you assess it

Mr. under the 159th Section, the property benefited will have to pay it; it does not  
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2733. You at one time, I think, were under the impression that Greenwich parish had done all that is needed to be done?—I think we have done all that might consistently be required of us.

2734. How is it you come out the second on the list of persons to be charged?—I was rather surprised to see it in Sir Joseph Bazalgette's return; it took me by surprise; but we have had no overflow; even the last large overflow, one Sunday in October or November, did not overflow the river wall of the Greenwich Marshes.

2735. How does it come that you are to pay 10,600 £.?—Because Sir Joseph Bazalgette proposes to add three feet to the river wall in Greenwich Marshes.

2736. That, in your judgment, is useless?—I do not say that I would put my opinion against Sir Joseph Bazalgette's, but, practically speaking, the Thames has not overflowed since the Greenwich District Board raised the walls.

2737. Your Board, whatever you may have, have another objection; did not you strongly object to that part of the Bill, in the first instance, compelling them to raise the banks in a way to be prescribed to your Board, which does not bind itself to provide anything for the cost; did not your Board make that objection?—No. My Board made one objection, and when I put the matter forward as their representative at the Metropolitan Board, they gave me their full and entire support, and every one of them passed a resolution directly contrary to what they had done before.

2738. You converted them?—Yes.

2739. That was their view originally?—Yes.

2740. How did you convert them?—I told them the truth, and I made the matter clear to them.

2741. How did you convert them; they very strongly objected to that part of the Bill which would in the least way compel them to do so?—They thought it would be a charge upon the ratepayers, and I told them it was no charge upon the ratepayers, that the ratepayers, *quid* ratepayers, would not have to pay a shilling.

2742. You should say, as I think, not as I thought, because I still think so?—I showed them the Act of Parliament, and it is plain that it is not a charge upon the ratepayers. Power is given to the Metropolitan Board of Works by Statute, because they are the elective representatives of the metropolis, and they have full power to judge of those things, and having that power they exercise that power.

2743. Where in any Metropolitan Board Bills is there any such power as is given here of ordering works to be done, and the rates to be levied by another person?—I do not remember.

Cross-examined by Mr. *Pember*.

2744. I have only one or two questions to put, and I will read this in order to make them quite clear; I will read the Resolution of the 7th of April 1876. "That so much of the report as relates to the question of protecting the metropolis from inundations from the overflow of the Thames be approved, and that in the opinion of this Board it is desirable that they should confine themselves to strengthening the powers of vestries and district boards to enable those bodies to carry out the provisions of the 69th and 70th Sections of the Metropolis Local Management Act, 1855, and that this Board should have power to intervene, and to require the execution of necessary works." Did you vote for that resolution?—I was vice-chairman of the Works Committee, and brought up that recommendation.

2745. Did you vote for that resolution?—I think I did; I have no doubt I did.

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Cross-examined by Mr. Bidder.

2746. All the evidence you have been giving in favour of the Bill proceeds, does it not, upon the assumption that the floods of the particular localities are matters with which the Metropolitan Board have nothing to do, and have no responsibility in respect of?—They have nothing to do with them.

2747. They are not responsible for their recurrence?—No.

2748. If it were the case that those floods had been in any way caused by the Metropolitan Board of Works themselves, would that alter your opinion?—It might possibly.

2749. If it were the case that the floods have been caused or contributed to by the acts of the Metropolitan Board of Works, would that alter your opinion as to the justice of the mode of levying the necessary cost and providing this money?—That is an abstract question it is impossible for anybody to answer, because I am perfectly satisfied that no such fact has taken place.

2750. Being perfectly satisfied, which I can quite believe, will you answer my question?—I cannot give an answer to that question.

2751. I have a right to put a hypothetical question; I will not discuss the engineering question with you, because you are not an engineer; assuming that the Metropolitan Board of Works contributed to the existence of the floods, would you still say that it is just that the expense of providing against them should be levied on a particular locality?—I cannot answer the question.

2752. Yes, you can?—No, I cannot. I decline to answer a question put in that way, because it is only calculated to mislead; high tides in the metropolis are not engineering questions. We have high tides at Sheerness, and there is no high tide in the City of London without it is first of all a high tide in the British Channel. It is absurd to put such a question.

2753. I ask once more, and if you please you can decline to answer?—I decline because it is a question put for a certain purpose, and it can lead to no good result.

2754. I put it to you, if it appears that those floods have been contributed to by the Metropolitan Board of Works themselves, in your judgment is it just that this system of paying for their prevention should be adopted?—I can only repeat what I said; it is no use asking the question.

2756. Mr. Bazalgette.] Adopt the hypothesis, and answer it subject to that?—If you say I am to accept the hypothesis, I am ready to give an affirmative answer.

2757. Mr. Bidder.] I say, would it be just?—If you put it in that way, I answer it in the negative.

Cross-examined by Mr. Pembroke Stephens.

2758. You, I think, were a very strong upholder of the view that the parishes had power enough?—No, I did not say that; I said that they had power enough to do everything but enter upon private lands.

2759. Did not you object to the parishes invoking the assistance in any way of the Metropolitan Board of Works?—Certainly not.

2760. Did not you go the length of saying that the parishes ought to put in force the powers they already had, and not to be calling upon Jupiter to come down and help them?—I made that remark, but by Jupiter coming down to help them, I was referring to the whole metropolis paying their burdens.

2761. And you think Jupiter would come down and help them in that way?—I do not think he would.

2762. Greenwich we know has been put down 10,600 £. to pay?—Yes.

2763. The principle you recommend is that Greenwich should pay it?—I do not know what you mean by Greenwich; it is the area benefited in Greenwich.

2764. I used the expression used by Sir Joseph Bazalgette; in whatever sense he meant Greenwich, I mean Greenwich?—The sense in the Bill is that the

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area of Greenwich benefited by the expenditure of money should pay that expenditure.

2765. Would it be something more or less than the Greenwich district?—Very much less than the Greenwich district, not one hundredth part of it.

2766. One hundredth part of Greenwich is to find the 10,600 *l.*?—Yes.

2767. Would Greenwich be one of the exceptional cases in which the Metropolitan Board of Works should contribute?—I am not prepared to answer that question at the present moment.

2768. Supposing the Metropolitan Board of Works did contribute, out of what funds would it do so?—Out of the monies it raises under its general statutes, and which it recovers as a sewers rate over the whole of the metropolis.

2769. Then supposing the one-hundredth part of Greenwich, in the first instance, to have paid its 10,600 *l.*; and supposing the Metropolitan Board of Works to find an exceptional case somewhere else to contribute to, Greenwich having paid its own share, would have again to contribute to the exceptional case somewhere else?—Yes, according to its proportion.

2770. That you put forward as an equitable scheme?—Yes, we have adopted it already in Greenwich.

2771. Taking the area of the hundredth part of Greenwich, what would 10,600 *l.* come to upon that?—I have no means of telling you what the rateable value of the district is.

2772. It is your own district?—I cannot tell you.

2773. I am told roughly, something like 40 *s.* in the pound?—I do not think anybody can say that, because they do not know the area over which it would be cast.

2774. Assuming that, would it be a reasonable thing, with the liability of further contribution to the Metropolitan Board of Works afterwards?—There is power in the Bill to borrow money and spread it over a period of years.

2775. Whatever are the powers in the Bill, you think them reasonable?—It would be reasonable if necessary; that is the principle.

Cross-examined by Mr. Philbrick.

2776. You told one of my learned friends that the principle of taxation, with reference to sea walls in a Level under the Commissioners of Sewers, was so carried out through a jury; that lands were taxed in proportion to the benefit derived?—It is not through a jury; the jury determine the work to be done, and the Commissioners of Sewers determine upon whom the incidence of taxation shall fall.

2777. The principle is rating according to the benefit derived from the work?—Clearly so.

2778. There are two classes of improvements in the metropolis, one borne by the ratepayers at large through the Metropolitan Board, and which you called metropolitan improvements?—Yes.

2779. The other more purely a local improvement?—Yes.

2780. In that case, is the practice of the Metropolitan Board to contribute a moiety, settled by agreement, which they pay out of the general rates, and leave the district to do the rest out of the district rate?—Yes, local improvements.

2781. With regard to through communications and thoroughfares, they are put always on the metropolis at large, are they not?—Yes.

2782. That is the policy of the Board. For instance, the improvement of the River Thames being a great thoroughfare by water, that would be metropolitan?—Clearly so.

2783. An improvement of a main thoroughfare?—Clearly so.

2784. If you got to a side street or court, it would be a local improvement to which you would contribute, as you thought it of utility, or not?—Yes.

2785. As to the portion of Thames-street which was flooded; that is a main thoroughfare, is it not?—I was not aware that it was flooded.

2786. Assuming the work necessary to protect Thames-street from flooding, that would be a main thoroughfare, would it not?—Thames-street we consider  
a main

a main thoroughfare, as far as the improvement of the thoroughfare is concerned.

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2787. Maintaining a thoroughfare open for the use of the public generally? —Yes; but there is no parity between the widening of thoroughfare and the protecting of certain districts or lands from floods.

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2788. Excepting this; supposing that in order to keep the street clear from flooding the work is necessary, it would be a work ancillary to the purposes of a thoroughfare?—Yes.

Cross-examined by Mr. *Armstrong*.

2789. Not to leave it as a mere hypothesis; taking the case of Tooley-street, which is in my district, and which has been flooded on a recent occasion, is an improvement which keeps the floods out of Tooley-street a metropolitan improvement?—No, I should say not.

2790. Why not?—Because it is for the benefit of the owners of property subject to the floods.

2791. Are you aware of some improvements going on in the Harrow-road? —Yes.

2792. Is that a metropolitan improvement?—The Act of Parliament has declared it to be so.

2793. Why?—I cannot tell you why.

2794. Parliament has some reason for doing it?—You must apply to the House for that.

2795. What is the nature of the improvement of Harrow-road?—Widening the thoroughfare.

2796. That would be an improvement for the benefit of the people living in the houses adjoining the thoroughfare?—And for the benefit of persons wishing to walk or ride through it.

2797. Supposing I want to walk down Tooley-street, and I find a flood there, it is for my benefit that improvement should be made to keep the floods out?—Yes; but all questions of floodings may fall back to the original Statute law in existence ever since Henry the Eighth, and which has been proved again and again; we cannot compare the two things together; there is no parity between them.

2798. Is it not so; if I want to use a thoroughfare it is to my advantage to find the thoroughfare in a good state of repair?—Yes.

2799. You may apply the same principle to Tooley-street, and say that anything which keeps it in a proper state of repair is a metropolitan improvement? —You may say so.

2800. Am I not speaking the truth?—Yes, but it will not resolve itself into the question that the public shall pay for it.

2801. If I live six miles from Tooley-street, and use Tooley-street as a thoroughfare, I use it in a public capacity?—But because it is a private improvement, private persons should pay; it is the statute law ever since Henry

2802. I do not ask about the statute law; I ask why the Harrow-road improvement is to be a public improvement, and paid for by the metropolis, when the keeping of Tooley-street free from flood is to be considered a private improvement, and is to be paid for by people living in Tooley-street?—The

Legislature has determined that the widening of Harrow-road is a metropolitan improvement, and it has provided accordingly; the Legislature has not provided that the freeing from flood is a public improvement.

2803. Remember why you are here: you are here because the Chairman has stated the main point to be the incidence of taxation?—Yes.

2804. And you are here to give evidence as to the incidence of taxation?—Yes.

2805. You are not here to tell us the statute law as to other matters; you are here to give us reasons why the policy put forward by the Board should be adopted?—Excuse me; I am here to inform the Committee upon that which was the statute law; I was asked certain questions. I have looked up those questions all the way through, and I hope I have answered them intelligently.

2806. Give me a reason why Harrow-road is a public improvement, and keeping

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keeping Tooley-street clear of water is not?—I can give no other answer than I have given before; there is no parity between the two.

2807. You cannot give any reason why keeping such a thoroughfare as Harrow-road open should be a public improvement, and keeping Tooley-street clear of water should not be a public improvement?—There is a parity between making Harrow-road a public improvement and making Tooley-street a public improvement; they both have been dealt with in the same way, but when you are comparing the widening of Tooley-street as a carriage way and stopping the water coming over it, there is no parity between the two.

2808. Your definition of a metropolitan improvement was that a metropolitan improvement is an improvement which confers a benefit accessible to the whole of the population?—Yes.

2809. If Tooley-street is full of water, Tooley-street is not accessible to the whole population?—If Tooley-street is full of water, the houses are full of water, and the public have not their access to the houses.

2810. I do not speak of the houses; I want to go down Tooley-street; is it accessible to me as if it is for the water?—Not as accessible as if it was not full of water.

2811. Is it accessible at all, except in a boat?—It may or may not be; I cannot tell you.

2812. Is not that an improvement under your definition?—No, not under the terms of the statute.

2813. Now as to the memorials; what memorials have you had from St. Olave's parish?—I cannot tell you; I do not know that we have had any memorials. I find there is this one dated the 10th of March 1876. It was presented to the Board, "That your memorialists find that as your honourable Board have under consideration the draft of a Bill to be submitted to Parliament to amend the Metropolis Local Management Act of 1855 (especially Section 69), to empower your honourable Board to compel vestries, district boards, landowners, and others to construct, raise, strengthen, and maintain all banks, docks, wharves, and defences abutting on, or adjoining any river, stream, &c., in any parish or district within the metropolis, in such manner as may be directed by your honourable Board, for the effectual drainage or protecting from inundations such parish or district, and that your honourable Board further seek power, in the event of any such vestry or district board not complying with the requirements of your honourable Board to carry out such works as aforesaid to charge such cost upon any vestry, district board, landowner, or other persons, as under the terms and provisions of the Bill would be liable to such charge. That your memorialists' district has a frontage to the River Thames of about a mile, extending from London Bridge to St. Saviour's Dock, and many wharves and dwellings within the area of the district have suffered considerable damage. That within the last three years the district of your memorialists has suffered from two unusually high floods, the inundations causing much distress and loss among the poorer classes exposed to its effects, several houses in the districts being flooded to the extent of about 4 feet, some of which being in Tooley-street, Mill-lane, Morgan's-lane, Stoney-lane, Vine-street, Freeman's-lane, Horslydown-lane, and other places, leaving a deposit of mud and sewage prejudicial to the health of the inhabitants. That hitherto Parliament has recognised the important public character of the work of embanking the River Thames, as evidenced by the Acts authorising your honourable Board to construct the Victoria Embankment, the Albert Embankment, and, more recently, the Chelsea Embankment, granting to your honourable Board powers to raise the funds necessary for carrying out such works by loans on security of the coal and wine duties, or by a rate levied over the whole of the rateable property within the metropolitan area. Your memorialists therefore respectfully submit that it is not expedient for your honourable Board to seek the powers provided in the Bill about to be introduced by your honourable Board into the House of Commons to assess upon vestries, district boards, landowners, and others, the cost of such works as may be necessary for the drainage or protection from inundation such parish or district, or part thereof. And your memorialists humbly pray that your honourable Board will take such steps as may be necessary for the introducing into Parliament a Bill to enable your honourable Board to raise the funds necessary for such works in like manner as funds have been raised for the aforesaid Victoria, Albert, and Chelsea Embankments."

2814. That

2814. That memorial does not ask you to put in force the powers, supposing them to be there, in Sections 69 and 70 of the Metropolis Local Management Act?—It asks us to apply to Parliament for power to spread the cost of doing it over the whole of the metropolis.

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2815. That is different from putting into force any power that you have in Sections 69 and 70 of the principal Act?—They do not ask us to do that.

2816. Have you had before you a letter from St. Olave's district offering to withdraw their opposition to the Bill on certain conditions?—I do not remember it, or I have a very indistinct recollection of it.

2817. Supposing St. Olave's offered to withdraw the opposition on the condition of your being bound by the plans and estimates of Sir Joseph Bazalgette, would you, as a member of the Board, agree to such a proposal?—It would be very undesirable for a member of the Board to answer a hypothetical question when he cannot know all the circumstances of the case. Mr. Roche stated, and I agree with him, that no doubt the Board would withdraw the clause from the Bill which enabled the Board to exercise power, whether the vestries or district boards chose or not. I do not think that the Board intended such a clause to be in, but I am not prepared to answer the question that you put quite in that form. A letter has been sent, but I may say that there is no desire on the part of the Metropolitan Board of Works to interfere with the local boards and vestries one iota more than is necessary; but unfortunately all the district boards and vestries are lax in putting in force the powers they have, and therefore it is necessary that the Metropolitan Board of Works should have power.

2818. I ask as to the particular point; do you consider that the Metropolitan Board of Works will accept such an offer as that?—I do not know the offer.

2819. "That the Board withdraw their opposition to the Thames River (Prevention of Floods) Bill, conditionally on the specification of works furnished by the Metropolitan Board of Works being incorporated into the Bill, as the only works now or hereafter to be required by the Metropolitan Board of Works from this Board under the Bill." Are you prepared to accept that?—No, it is purely an engineering question. Sir Joseph Bazalgette stated that he did not bind himself particularly to that statement that he made.

2820. And you agree that we can get no just guide whatever as to the liability imposed upon us by these plans and estimates?—Considering that the Metropolitan Board is a representative body, I do not think that they should be required to do anything more than they have done; they are the body interested, but they have the power of doing everything for the general benefit of the metropolis, and to suppose that they are to put down in black and white every single power and liability that they incur, or every single thing they are bound to do, is a thing that you cannot expect.

2821. Are you prepared to accept such a condition as that?—No, it is impossible to accept it.

2822. Do not you agree that we cannot place any reliance at all upon the plans and estimates?—I cannot answer that, because it is in the mind of the engineer of the Board and not in mine.

2823. You mentioned the wallscott to be levied in the districts; have you any notion of the nature of the payments?—I know in my own district, before the Metropolis Local Management Act was passed, a jury was summoned by the Commissioners, and the jury determined what works were necessary; then the Commissioners did the work, and the money expended was raised by a rate, and the rate was called a wallscott, and the wallscott was raised upon the area benefited.

2824. Do you know where the Commissioners were chosen from?—There are some gentlemen present who knew them.

2825. I asked the question of one financier, and he could not tell me?—One lived in my neighbourhood; Sir John Thwaites was one of the Commissioners.

2826. You come to support the taxation which we, under the old law, leave to the Commissioners; who were the Commissioners?—Sir John Thwaites was one.

2827. I speak of the old law?—I speak of the Metropolitan Commissioners of Sewers. Sir John Thwaites was one of the old Commissioners of Sewers.



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2829. I talk of the Commissioners of Sewers to which you refer?—In Henry the Eighth's time there are three mentioned in the Acts specifically.

2830. Where was their property?—There are there mentioned; they were filled up in the Crown Office.

2831. Will you tell me where their property was situated?—They must have been owners of property on the Level that was to be benefited by the works executed.

Cross-examined by Mr. Locke.

2832. I do not know whether you are acquainted with the Fulham district?—I know some of it.

2833. Do you know the Mall at Hammersmith?—Yes.

2834. That leads up to Hammersmith Bridge, does it not?—Yes.

2835. Can you tell me what is the difference between that, as an approach to Hammersmith Bridge, and this approach to Deptford Bridge, which is going to be charged upon the whole metropolis?—If the question is asked purely as a question of improvement of a thoroughfare, they would be somewhat of the same character as an improvement of a thoroughfare.

2836. Are you aware that, under Sir Joseph Bazalgette's plans, the wall in front of the Mall at Hammersmith is to be raised 4 feet?—I do not know how much it is to be raised, or whether this is an improvement of the thoroughfare.

2837. It is to keep water off the thoroughfare?—Yes.

2838. Can you pass along a thoroughfare when it is covered with water?—There is no parity between them; if you want to improve a thoroughfare, you must alter the level of the place, and do a number of other things; but the raising of a bit of wall to keep water out is a very trifling affair.

2839. In what way will this benefit the Fulham district, the widening of the approaches to Deptford Bridge?—Fulham contributes to all the metropolitan improvements, and Fulham will be entitled to have improvements constructed in its own district; some have been constructed already, and we are now taking some of their open spaces, and maintaining them, and doing them up; but there has not been a large amount of money expended in Fulham. Shepherd's Bush is a place where we have spent a good deal of money for the benefit of the district.

2840. Do you know how many ratepayers there are in Fulham?—No.

2841. If I tell you that there are 14,000, would you agree to it?—You must not leave the Committee to form an idea that the 14,000 ratepayers have any interest in the question.

2842. Can you tell me the area to be benefited?—No, I do not know the levels of Fulham.

2843. Under this Bill there is nothing to prevent the whole district being taxed?—There is nothing in the Bill which will permit other than the owners of property being taxed.

2844. The ratepayers are the people who have always to pay the money first?—Yes, they pay it first, and then they deduct it; it is a landlords' question, and not a tenants' question.

2845. Do you remember when you converted your Board to support this Bill?—I do not know; it was some time in November or October last year.

2846. Was it before the 17th November, because there is a letter from your Board here?—It was somewhere about that time.

2847. At the end of their letter it says: "My Board fear at some future time they might, under the clauses of the Bill as it stands, be ordered to carry out expensive works where the object might be obtained by a simple and inexpensive means"?—I told them that if they did carry out inexpensive works they would be leviable upon the district benefited, not upon the parish.

Re-examined by Mr. Bazalgette.

2848. I understand you to say that it is not the intention of the Board, under the present Bill, to derogate in any way from the rights of the Conservators of the River Thames?—Certainly not.

2849. And

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2849. And as soon as the Conservators have developed the particular grievance which underlies their cross-examination, you have no doubt the Board will meet it in a way favourable to them?—No doubt whatever.

2850. At the same time, the Clause as it stands is merely a repetition of the existing law?—Yes, it is so.

2851. Then I will not trouble you with the quotation of my learned friend, but I will ask you whether the facts connected with the foot note were that the Metropolitan Board of Works felt that the charge bearing upon certain places was an unfair one, and therefore applied of their own motion to Parliament in order to place it upon the metropolis at large?—It was purely an Act of the Metropolitan Board of Works, because they considered it unfair to assess a district with the cost of a large and important main sewer.

2852. And I believe the particular works which were affected by it were works which formed an integral part of the main drainage system?—Yes, the sewer is under the charge of the Metropolitan Board of Works now, and was at that time.

2853. My learned friend asked you whether the Langham Hotel was assessed to the drainage system of the south side of the river; I presume the Langham Hotel would not have communication physically with the sewerage for the south side?—No.

2854. Was the primary object for which the main drainage was called into existence, to relieve the Thames of sewage which found its way into it, and polluted its waters?—Yes.

2855. Now, to test whether the north and southern systems of drainage can be separated, let me put it in this way; if the northern system had been carried out, and the southern system had been left unexecuted, would the river have been relieved of the sewage?—Certainly not.

2856. Supposing that the northern side carried out their system, would the northern side themselves have derived any benefit from it, if the southern side still continued to pour sewage into the river?—They might have derived some benefit, but not the full benefit.

2857. Therefore, it was simply a community of interest which governed the whole construction of the main drainage?—It was so.

2858. A community of interest which required the river which flowed between the north and south sides to be thoroughly cleansed and purified?—It was so.

2859. My learned friend asked you why you should take the powers to contribute, inasmuch as the principle of the Bill is that the cost is to be allocated according to the benefit; I will ask you whether, at the present time, the Metropolitan Board of Works has not extensive power of contribution towards works which, under the Acts, are purely local, and should fall wholly upon the locality?—They have that power unlimited.

2860. Let me call your attention to this table; first of all read the heads, which describe the sort of works which have got to be executed by vestries and district boards?—The following table will show—

Mr. *Littler* objected to the question on the ground that it did not arise out of his cross-examination.

Mr. *Bazalgette* was heard in support of his line of examination.

The decision upon the objection was postponed. (*See Minutes of Proceedings, 12th June.*)

2861. Mr. *Bazalgette* (to the *Witness*).] You have already stated that you did receive a representation from Lambeth, on the 19th November 1875?—Yes.

2862. And that representation asked you, as the Metropolitan Board, to put in force the 69th and 70th Sections of the principal Act?—I said so. It is the 19th November 1875.

2863. The gist of that is, as it affects the Bill, is it not, that the Metropolitan Board should put in force the 69th and 70th Sections of the principal Act?—Practically speaking, that is it, that the Metropolitan Board of Works be requested to put into immediate action the provisions of the Local Government Management Act relating to raising wharf and other walls along the riverside, with a view to prevent the periodical inundations which the riverside parishes are subject to.

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2864. Though that does not point out specifically what difficulty there is in enforcing the provisions, it is a proof that they would have hardly asked the Board to put any provisions in force if they could have put them in force themselves?—Yes.

2865. I will now come to the foot note at page 143 of Woolrych; look at the foot note "q" to the 169th clause?—This is the marginal note to the 169th section: "Provision for deduction by tenants of sewers rates;" and Mr. Woolrych puts this note "q:." "The sewers rate is a landlord's tax, and in the absence of any agreement binding the tenant to pay such rate, it may be deducted from the rent. A covenant to pay all rates includes sewer rates."

2866. So that Mr. Woolrych's view is that the sewers rate under which this will have to be levied is a landlord's tax?—Yes.

2867. Mr. Woolrych agrees with the view which you have already expressed?—Yes, he agrees that the sewers rate is a landlord's rate and not a tenant's rate; the tenant does not pay it, but the landlord does pay it.

2868. It has been suggested that this tax is in the nature of the tax and liability existing under the 69th and 70th Sections?—Yes.

2869. And Section 159 laid down the principle upon which the vestries and district board were to assess it?—Yes.

2870. You have been asked whether the charge of Greenwich itself is not very heavy, and I understood you to say that, heavy or not heavy, you accepted the view of the engineer of the Metropolitan Board of Works?—Yes; but we have it before us in evidence that in the district next us the wallscot has been as high as 12 s. in the pound; that is in part of the parishes next to us; in our own parish it was 4 s. and 5 s. in the pound.

2871. Then my learned friend, Mr. Pember, asked you whether you did not vote for the resolution which laid down the principle that it should be for the purpose of strengthening the hands of the vestries?—That was the main principle of the Bill, to strengthen the hands of the vestries.

2872. And I suppose the Bill before the Committee is governed by no particular resolution of the Board?—No, the Bill is not governed by the proceedings of the Parliamentary Committee; it is governed by the principle of a resolution agreed to by the Board. The custom is for the Board to determine the principle, and it is left to the Parliamentary Committee to prepare the Bill; and when the resolution was approved, it was left to the Parliamentary Committee to prepare the Bill with the Equity draughtsman.

2873. As to the clause, it says it has been approved by a majority of the Board?—Yes, it has been approved by a majority of the Board.

2874. Then my learned friend, Mr. Bidder, asked you to assume that the flooding was caused by the Board, and upon that assumption whether, in your opinion, the charge should not be metropolitan?—Yes.

2875. I will ask you upon that: supposing an hypothesis which I do not admit, but that some flooding had been caused by the works of the Board, would not it be rather a ground of contribution by the Board to the works than a reason for throwing the charge upon the whole metropolis?—Yes, it would be, but it should be stated beyond that.

2876. Supposing the amount of flooding caused by the works is infinitesimal, would it be right, because the Board have caused an infinitesimal amount of flooding, to introduce a new principle of taxation, and throw the cost upon the metropolis?—No, it should be placed before the Committee, that wherever a flood has taken place in the metropolis, 24 hours before it would have been found in the Channel. In the last very high tide we find it commenced down in Devonshire; there was a very large destruction of property between Dawlish and Teignmouth; then next it was found in Weymouth; then you follow it up to Portsmouth and Brighton; you have it at Hastings, and enormous destruction was done there. And lastly you have it when the tide comes up in the neck of the Channel, in Dover; and common sense says it must come up the river, and it has come up the river. We had a high tide in London because it was in the Channel, and not from the Thames Embankment; it is monstrous to suppose it was; all the water displaced by it would not raise it an eighth of an inch.

2877. Now I come to Mr. Stephens. Assuming that Greenwich was called upon to contribute, it would have, first of all, to pay its 10,000 £, and then to have to bear a clear share of the contribution to some other district in case you contributed to it?—Yes.

2878. Is

2878. Is that a departure from the principle which at the present time governs the contributions of the Board to local works executed by local bodies?—No, it is the principle that has ever existed.

2879. There are certain works which have to be done by local bodies?—Yes.

2880. The Board takes power to contribute?—Yes.

2881. And when the Board takes power to contribute, the locality may have already paid for its own work, and have paid its share of the contribution to some other work?—Yes, each pays, of course, their own proportion of it.

2882. My learned friend Mr. Armstrong has drawn comparison between Tooley-street and Harrow-road; first, to get clear what we have done as to Harrow-road. Harrow-road has been declared by Parliament to be a metropolitan improvement?—Yes.

2883. You have been asked why; you are not in the secret councils of the Committee?—No.

2884. Supposing that the Board do treat it as a metropolitan improvement, we have subscribed the metropolitan rates, and the local body who has jurisdiction over it will pay for repair and maintenance?—They have to keep the streets up afterwards.

2885. Therefore it is a primary improvement which becomes the subject of metropolitan charge?—Yes.

2886. Now take Tooley-street; works are in progress for the widening of Tooley-street?—Yes.

2887. If a comparison exists between Tooley-street and Harrow-road, the comparison would stand upon the same ground as a street improvement?—Yes.

2888. And Tooley-street and Harrow-road can be made the subject of a metropolitan charge?—Yes.

2889. Assuming the water finds its way into Tooley-street and blocks it up so as to make Tooley-street impervious to traffic, would not that again be one of the cases where the Board might give special contribution, or would it be a reason for making the whole cost of the works metropolitan?—It might be a cause for special contribution.

2890. It could not afford a ground upon which any such principle could be based, of making it universally a metropolitan charge?—No.

2891. You were asked whether you would agree to a clause by which the body my learned friend Mr. Armstrong represents would withdraw opposition, making a fixed specification of the works in the Bill; would it be possible or advisable to incorporate any such specification in the present Bill?—No, I think not.

2892. Taking such an illustration as that of my learned friend who represents Mr. Corry; as the works were first suggested, they affected Mr. Corry's works rather seriously?—Yes.

2893. But when the way in which his premises were affected was pointed out, by a simple contrivance the difficulties were overcome?—Yes.

2894. If a hard and fast specification, pledging the Board to a hard and fast mode of adopting this plan had been accepted, would any such subsequent modification have been possible?—Certainly not.

2895. That again would tell upon the claims of compensation?—Yes.

2896. If a hard and fast line were adopted, the compensation might be heavy, whereas if, on the other hand, it was left subject to modification, it might almost be done away with?—Yes.

2897. As to the approaches of Hammersmith Bridge, do you know whether it comes up the bridge directly, or passes under the bridge?—I almost forget. I think it passes under. I almost forget.

2898. Do you know whether it is not to afford access to houses rather than in the nature of a metropolitan road?—It is so, I believe; it is only a narrow road; it would not be called a metropolitan highway; it is only 20 or 25 feet, or something like that.

2899. *Chairman.*] Do you know whether the floods have ever affected the health of the flooded district?—I know they have in our district; that is to say, where the houses of these poor people have been flooded, it has very often taken place at night. Some of them have been subject to very severe colds, and possibly other evils arise from that indirectly. The health of the inmates of the houses that have been flooded greatly suffers, and it is a duty of every district to prevent them. We have done as much as we could to prevent them.

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2900. Have you heard of the diseases caused by the floods spreading beyond the flooded area?—No; it has been principally colds, and diseases of the chest, and things of that kind. Sometimes they have terminated in death, but after some little interval of time.

2901. Did the Metropolitan Board ever consider whether the whole area to be immediately benefited ought not to be treated as a whole, and the rate levied over that district?—Over what district?

2902. The low-lying land subject to inundations?—No, it has not been considered in that way, and I think I may say further, in answer to that question, that we have been necessarily guided very much by our legal advisers, and there seems to have been the necessity for the Board to prepare the Bill in the form they have done. We are obliged to consider the existing statutes, and the principles existing in every statute that has been already passed by the Legislature, and see whether that which is brought forward now has been brought forward in compliance with those principles. We were told that any other Bill would have no *locus standi* at all.

2903. I understand that you cannot form any estimate of the increased value which is likely to be given to lands protected?—You might give a reasonable idea when you take Lambeth; there is a mass of low-lying land, and when it is a high tide it is flooded, and the owner of that property lets his land at a very low ground rent; some wretched property is put upon it; it passes gradually from one hand to another, and because it is low lying and constantly flooded, it falls into the hands of the lowest class of persons; if you relieve the land from prospects of flood it will be available for warehouse purposes, and may be increased in value 400 or 500 per cent.

2904. You have never tried to work that out?—No.

2905. Mr. Gordon.] You made allusion to some improvements at Shepherd's Bush, which you treated as metropolitan improvements?—Shepherd's Bush Common is taken in charge by the Metropolitan Board.

2906. What is the nature of the works?—It is merely taking charge of it as a metropolitan common under the Metropolis Commons Act, and keeping it in order and preventing any improper trespass upon it; and there is some considerable work going on there now, because the common is very low lying; the draining of the surrounding districts comes upon it, and makes it very slushy in wet weather, and we are now raising the common; it is 9 or 10 acres; so as to give it a dry aspect.

2907. It is done entirely as a metropolitan improvement?—Yes.

2908. Do you know that the water brings up a quantity of sewage from the adjoining districts?—If any of the low-lying lands are flooded, the only escape for the water is down the gullies into the sewers, and, of course, a certain quantity of water getting into the sewers, they are tide-locked; they are soon filled, and then the sewage flows over the sewers and comes into the houses; and every flood is not only a flood of the Thames water, but it is a flood of Thames water *cum* sewage necessarily, and must be so.

2909. Sir George Elliot.] Are you aware of the estimate of Sir Joseph Bazalgette?—Yes, I have seen the Paper he has given us; 50,000 *l*.

2910. There is a large area of land, I believe, that is covered with water in consequence of these inadequate walls at Fulham?—Yes.

2911. If for 50,000 *l*. all this land could be reclaimed and rendered much more valuable, 400 or 500 per cent., it would involve a great advantage to the owners of property; instead of a tax, if your estimate and opinion is well founded, it would be a great gain to those persons whose land would be improved by that which is now suggested?—That is the primary principle of all the legislation that has taken place, that it does benefit the land in question, and because it benefits the land in question, the land in question shall pay for it; it is the principle of every statute that has ever existed.

2912. Fifty thousand pounds appears a very small sum to protect all the enormous property, increasing the value of the land 400 or 500 per cent.?—It is nothing more than an embankment for the purpose of preventing the river flooding these lands.

2913. It all turns upon the question of the water wall?—We had a deputation from Fulham upon that question, and when we asked questions of those coming up, we found the persons coming up to the Board were under covenant to their landlords to keep up the walls and maintain them, and, therefore, if the Metropolitan

politan Board made the walls, it would relieve the tenants from the burden they all have undertaken by covenants in their leases.

2914. You are aware that there have been other high tides besides the one that came from the Channel into the Thames?—Yes, many.

2915. Within the last three years?—Yes, four or five, but they all began in the British Channel, or the North Sea.

2916. They must commence somewhere?—Yes.

2917. Are you aware that for 50 years they have been of the same kind?—There has only been one as high as the one we speak of; that began down in Devonshire, and we can trace it all the way up the Channel, but I am afraid there is nothing to show that we may not have other high ones.

2918. Are you aware that within the last three years we have had four or five tides higher than any you have had within the last 50 years?—Yes.

2919. You had no explanation of it?—No, except that it was in the Channel first of all; we cannot give any reason why the water rises in the Channel at an enormously increased height.

2920. You would not suppose it possible by any interference with the Thames that a larger influx of water might come into it and rise to a higher level in consequence?—If you find the Channel rising three feet higher than before, it is very likely indeed you will find the water in the Thames considerably higher than it was before. The great preservation that we have got in the City of London is this, that every wind which brings the water into the Channel, keeps it out of the river; it is a westerly wind which brings it into the Channel, and it is a westerly wind that blows it out of the Thames. That is a protection or we should have had it higher than we have had.

2921. Mr. *Locke*.] The water from the sea comes up to a great extent?—I believe in high tides I have heard it stated that you may trace the marine salt far above this House.

2922. Has it not come to a greater extent on the opposite side of the river from where we are now sitting, since the alteration was made along the north side of the river?—I cannot speak of it in an engineering point of view. I think I am correct in saying that Sir Joseph Bazalgette was asked the question and he gave an answer. I would rather not answer it myself, but I am sure that that question was put to Sir Joseph Bazalgette.

2923. The water that comes up the River Thames, although there are a number of buildings along the side, is precisely the quantity that came up before?—Yes.

2924. Is it not obvious that there would not be so much room for the water to come up as there was before, when you had it open on both sides?—I think if you read Sir Joseph Bazalgette's evidence, and Mr. Law's evidence, it is of a scientific character, and they explain the reasons why if you narrow the channel you are sure to deepen it, and that leaves you precisely as you were before.

2925. Has not a greater quantity of water fallen over the other side than it did before?—I think I am right in saying that Sir Joseph Bazalgette does not think so.

2926. Did he say what he saw?—He does not attribute it to that cause.

2927. What cause does he attribute it to?—To the quantity of water flowing from the Channel or the North Sea.

2928. If the same quantity of water that came before is to come now and cannot go over on one side, must not it go over on the other?—I do not think so; water naturally finds its level.

2929. It finds its level over on the other side?—It finds its level up and down.

2930. Is it not the fact that at Southwark a great deal more water has fallen over than before?—There have been higher tides lately, within the last three or four years, than in previous years.

2931. And did not the water go over on the other side at Southwark and other places?—Only because it was low lying, and the places being under the level of the tide, all the water flowed over them naturally.

2932. It does not flow on one side, because there is a road on one side, and the water cannot get over there?—The water cannot get over this embankment.

- Mr. *G. B. Richardson.* 2933. When that was raised on this side, who paid the money for it?—It came out of the coal and wine dues.
- 11 June 1877. 2934. That is not all; there was other money raised besides that, was not there?—No.
2935. Throughout the metropolis?—No other money.
2936. Did not persons, whether they were upon this side or that side, have to advance money for the expense of what was done?—No, the money was borrowed of the Bank of England under a mortgage of the coal and wine duties, and is being paid off now.
2937. Was that the only fund?—That was the only fund employed for the purpose of the Thames Embankment and main drainage.
2938. Have not there been taxes as well besides?—The rates are levied over the metropolis, and the coal and wine dues produce a great deal more than the amount levied.
2939. Those taxes are levied throughout the whole metropolis?—Yes, and not only upon the metropolis, but beyond the metropolis.
2940. The only difference that you now make as to the expense is, so far as the persons on the other side of the river are concerned, and not this, is not that so?—Yes, in one sense it is.
2941. Is not that entirely different from that which took place on former occasions?—No, it is not.
2942. Is it at all like it?—In one sense it is different, and in another it is not so; one is taken as a metropolitan improvement, and the other is treated as drainage improvement, which is charged upon the locality.
2943. You call things different names; the people will get paid just the same under the circumstances as they would before?—There are different statutes governing the proceedings.

Mr. *Charles Mills Roche*, re-called; and further Examined by  
Mr. *Bazalgette*.

- Mr. *C. M. Roche.* 2944. ON Friday, when the Committee adjourned, I was asking you about a suggested analogy which my learned friend, Mr. Littler, set up between the main drainage works and the works contemplated by the Bill; I understood you to say that you rejected any such analogy?—Yes.
2945. First of all, my learned friend, Mr. Littler, suggested that the high level and the low level system of sewers were a separable system; as a matter of fact, in the high level, the low level, and the middle level are all physically connected with each other?—They are all connected with each other; if the high level gets full, there is an overflow from it into the middle, and again from the middle down into the lower level; it overflows again into the Thames; the whole is one complete system, north and south of the metropolis.
2946. We have had this already, but the test of whether the benefit of the main drainage is metropolitan, although the works may be separable, may be found in the fact that if the north works were executed apart from the southern works, the expense would be thrown away and useless?—Yes, of course. You would not have freed the Thames from the filth that was flowing into it.
2947. The object of the main drainage works was to relieve the Thames of the sewage polluting its water?—Yes; and to carry it down a certain distance into the sea.
2948. May I put it, that as regards the incidence of taxation of the main drainage, that the evil was metropolitan, the cure was metropolitan, and therefore the cost was metropolitan?—No doubt, and although metropolitan of itself, a larger benefit has been derived by all the low-lying districts, but it was metropolitan in its character.
2949. Applying the same form of speech, if I may, to the works contemplated by the Bill, would you say the evil is local and the cure local, and the cost should therefore be local?—Not only is the evil local, but the property that is improved by remedying the evil is also local and gets the benefit of the expenditure; that is the great principle. For instance, if you take Fulham, some of the land may be let for certain purposes at 5*l.*, and that if it is let only at that price



price (being worth 10 l.), by reason of being constantly flooded, the moment the bank is put up, and the land is no longer flooded, and the market gardeners no longer lose their crops, they will give a much larger rent for the land than with its liability to flooding, and the owner will get an improved rent, and the owner will get the benefit of the bank put up in that locality.

2950. As to the analogy set up between the main drainage works and the works proposed under the Bill; have you considered the comparison between the Thames Embankment and the works proposed under the Bill; am I right in stating that the first and paramount object in constructing the embankments of the Thames was to get a street improvement?—And to carry out the low-level system of drainage; the main principle was to get a new and complete fine thoroughfare from the Bank of England to Charing Cross and the Houses of Parliament; and that improvement consisted not simply of the embankment, but of the street called Queen Victoria-street, from Blackfriars Bridge up to the Mansion House, it was all one improvement; a street improvement.

2951. On the north side you said that the Victoria Embankment, as you have pointed out already, is not limited by the embankment *quâ* thoroughfare, but was designed to relieve the Strand?—Yes, the Strand and Fleet-street and Ludgate-hill, and it has relieved the traffic of those streets very largely.

2952. Still upon the north side you have the Chelsea Embankment, which is also an important and great thoroughfare?—Yes.

2953. Now, coming to the south side, you have the Albert Embankment, which is a great line of thoroughfare, extending from Vauxhall to London Bridge, *via* the York-road, Stamford-street, and then coming into the new street improvements of the Metropolitan Board of Works?—It has completed a main street on the south side of the Thames.

2954. It is one great thoroughfare which goes from the extreme east of London right into the west?—It is so. I have driven along it.

2955. Then street improvements and drainage improvements are treated by the Metropolitan Board as subjects for putting a charge upon the metropolis at large?—Yes, and they are effected in all parts of the metropolis; the extreme north or the extreme south, the extreme east or west; all parts of the metropolis benefit by street improvements, or get some street improvements from time to time in their localities; therefore they are all treated as metropolitan.

2956. Viewing, therefore, the embankments as being merely street improvements, would not the cost, according to the usual principle, fall upon the metropolis?—Yes.

2957. Setting the question of street improvement upon one side, can you tell us whether the Victoria Embankment was also required for the purposes of the main drainage?—Yes, it was required for carrying the low-level sewer along the banks of the Thames.

2958. Was the Chelsea Embankment also required for the purposes of main drainage?—Yes.

2959. And is main drainage again one of the subjects considered by the Metropolitan Board of Works as subjects for a metropolitan charge?—Yes.

2960. So that if considered apart from street improvements, and as main drainage, the two embankments, so far as they are an integral part, would come within the metropolitan improvements as a metropolitan charge?—Yes.

2961. It is an obvious *sequitur* that, if viewed as street improvements, they are subjects of a metropolitan charge, and if viewed as main drainage, they are subjects of metropolitan charge; therefore, viewed in both points of view, they must be so?—If it is a metropolitan charge, it is a metropolitan charge. It may answer a great many purposes, but it is quite sufficient if it carries out one principle.

2962. Having stated the purposes for which the embankments were constructed, would the protection of the low-lying districts along the line of the embankments from flooding be a primary object, or an incidental effect?—It certainly was not the primary object; it may have been an incidental effect, but it was not the primary object, and never would have been carried out simply for that object.

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2963. Supposing those metropolitan embankments had only had the effect of preventing floods, and had provided no main drainage, and provided no thoroughfare, ought their cost, in your opinion, to have fallen upon the metropolis?—They never would have been made.

2964. But assuming them made, would their cost be the subject of a metropolitan charge?—I cannot assume that they would ever have been made; it is not possible, or probable, under the circumstances, simply for floodings.

2965. There must be an accessible benefit to the whole of the metropolis in order to make it a metropolitan charge?—I do not understand the term.

2966. Take the case of the Thames Embankment; the improved thoroughfare is in a sense accessible to the whole of London?—Yes; you mean by increasing the facilities of the traffic. In that sense I quite understand it.

2967. Taking the case of the main sewer which passes through it, that again forms part of an accessible system to the whole of London?—Yes.

2968. Take the case of the works proposed by the Bill; can it be said in any sense that it is an accessible benefit to the whole of London?—No; not only is it not a benefit to the whole of London, but it is an exclusive benefit to other districts, and no other part of London can get a similar benefit in any way.

2969. I do not know whether it is worth while for me to refer to the 69th section again, but upon the question of tides and tidal rivers, I understand you to say that your view is that the word "river" covers everything?—If the word river does not cover the River Thames, I do not know what it does cover. If anyone can, under that section, say that the River Thames is not included, I cannot understand such an argument myself.

2970. Now, coming to my learned friend who represents the Limehouse district, we have had their representation before us, and I will pass to Clause 11 of the present Bill; I think in cross-examination you stated that that clause might be a little strong?—Yes.

2971. In your opinion, might it possess some utility in cases of emergency?—Yes, that was intended.

2972. Although you stated that it might be rather strong, I will ask you whether you cannot contemplate cases of emergency where its operation might prove of utility?—Yes, I do think it rather strong. Since that time I have had an opportunity of considering the clause as to what circumstances might arise, and it is to cover a state of circumstances which might arise like this: there might be an owner of wharf next to works to be performed by a vestry or district board, and the owner of the wharf might be liable by prescription or tenure to do the work.

2973. I will ask you to explain the answer to Question 2255: "Unless there was some absolute necessity otherwise"?—Take a case as follows, which may probably arise: an owner of a wharf is liable by prescription or tenure to raise his wall; next to him a vestry may be liable, then another owner by prescription or tenure is liable to do works, and then a district board liable to do works; it may be that they may occupy very small riverside frontages; some of the parishes have a very small river frontage; it may be that a continuous work is necessary to be done; it may be that a flood is expected suddenly, and those who are liable by prescription or tenure may refuse to do the work; under this clause the Board would have power to go in and do the continuous work, the owners by prescription having refused to do it, and charge each of the vestries and district boards, and the Board then would compel the owners by prescription to pay, whereas the vestries and district boards might refuse to enter upon litigation. It was to cover a state of circumstances like that that the clause has been inserted.

2974. It has been suggested by my learned friend, Mr. Pember, as to this particular Clause 11, that if it becomes law it would be a practical ousting of the local self-governing of the vestries *pro tanto*?—Nothing of the sort; it is intended to meet cases of emergency where works are necessary, and where the parties cannot be brought to act in unison to carry out what is necessary.

2975. Then you refer to Section 137 of your principal Act, in order to show that

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that the Board can in certain cases oust the jurisdiction of the vestries or district boards which they have hitherto possessed ; it is Section 137 ?—Yes, the 137th section is, “ In case it appear to the Metropolitan Board of Works that any sewers in the metropolis not hereinbefore vested in such Board ought to be considered main sewers, and to be under their management, it shall be lawful for such Board, by an order under their seal, to declare the same to be main sewers, and thereupon the same shall vest in and under the management of the said board ; and it shall also be lawful for the said Board by any such order to take under their jurisdiction and authority any other matters in relation to sewerage and to drainage, with respect to which jurisdiction or authority is by this Act vested in any vestry or district board.”

2976. Is not that a very wide power enabling the Metropolitan Board in their own discretion to take the sewers from under the jurisdiction of the vestries and place them in their own jurisdiction ?—I believe that under that clause the Metropolitan Board of Works might if they thought fit take under their jurisdiction the entire sewerage and drainage of London.

2977. Now, turn to Clause 146.

Mr. Littler.] Does that mean a branch sewer ?

Witness.] Yes.

Mr. Littler.] And main sewers are expressly mentioned.

2978. Mr. Bazalgette.] My learned friend, Mr. Littler, has raised an objection, and to show that it is not a sound one, let me put this question : Section 135 vested all the main sewers in the metropolis within the jurisdiction of the Board ?—All those set forth in Schedule (D.).

2979. That is being the main sewers then existing ?—Yes.

2980. All the main sewers then existing were vested in the Metropolitan Board ?—All the sewers called main sewers under Schedule (D.), were vested in the Metropolitan Board of Works.

2981. The rest being left in the hands of the districts and vestries ?—Yes.

2982. Does not Section 137 step in and say, if the Metropolitan Board think fit they may declare a sewer, which was not a main sewer, to be one, and may vest the subsidiary sewer in themselves ?—Certainly.

2983. And also to take under their jurisdiction “ and authority any other matters in relation to sewerage and to drainage, with respect to which jurisdiction or authority is by this Act vested in any vestry or district board ” ?—We have the most complete control over the sewerage of London. The vestries cannot make a sewer without submitting it first to us for our approval.

2984. Now look at Section 144, “ Power to Metropolitan Boards to make improvements.” Is not the effect of that again to allow the Metropolitan Board to oust the jurisdiction of the vestry with regard to the making, widening, and construction of streets and roads ?—Yes, there is full power to the Board to widen any streets in the metropolis.

2985. Mr. Littler.] You have to get an Act of Parliament first ?—Indeed we have not the necessity of getting an Act of Parliament ; we have done it without ; we have taken land by agreement, but we have power to go and do it independently of the vestry.

Mr. Littler.] That is all to be defrayed at the cost of the metropolis at large by this very section.

2986. Mr. Bazalgette.] It is not so ; the words are, “ may be defrayed ; ” it is only optional. I will just call attention to the words which my learned friend has used, and they will show how ill considered these interruptions are. My learned friend says “ the expenses of such application may be defrayed as other expenses of the said Board ; ” the words preceding are, that the Board “ may make applications to Parliament for that purpose, and the expenses of such application may be defrayed as other expenses of the Board ” ?—Yes, that is so.

2987. Now I want to get upon record some of the sections which regulate the relations of the Metropolitan Board of Works with the vestries and district boards ?—Yes.

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2988. Take

Mr. C. M. Roche. 2988. Take the principal Act; first of all Section 211, which is Woolrych, at page 164?—Yes.

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2989. I will take this as shortly as possible, to show the relations between the district boards and the Metropolitan Board of Works. Take Section 211; does not that give power to appoint a committee to appeal against the orders of the vestries and district boards in certain cases?—Yes.

Mr. Littler.] This is with respect to the “construction, repair, alteration, stopping, or filling up, or demolition of any building, sewer, drain, water-closet, privy, ashpit, or cesspool.”

2990. Mr. Bazalgette.] I am sorry that my learned friend, upon my stating it generally, in order to save time, should have interrupted me. (To the Witness.) Then will you refer to Section 212, at page 165 of Woolrych?—Yes.

2991. That provides for the appointment of a committee of the Board for hearing such appeals?—Yes.

2992. Now turn to Section 138, at page 100, of Woolrych?—Yes.

2993. Does that give the Board power to make orders to control vestries and district boards in the construction of sewers?—Yes.

2994. Section 139, at page 100, again authorises the Board to direct the appointment of officers for parishes or districts only?—Yes.

2995. Section 140, on the next page, enables the Board to place the streets in different parishes under the management of one vestry, or part of a parish under the vestry of a parish adjoining?—That is so.

2996. Now Section 5, at page 6 of Woolrych, does that give power to appoint a number of vestrymen and assign them to different parts?—Yes.

2997. Section 135 vested the main sewers in the Board?—Yes.

2998. Section 144, as we have already seen, enables the Board to enter into districts, and construct and alter streets, and so on, after application to Parliament?—Yes.

2999. Section 183, at page 145, enables the Metropolitan Board to sanction loans to vestries and district boards?—Yes.

3000. Now take the 21 & 22 Vict. c. 104, the Main Drainage Act, Section 57, at page 283?—Yes.

3001. Does that give power of appeal to the Board against orders of vestries and district boards as to amount or apportionment of expenses of the construction of sewers?—Yes; any person who feels “aggrieved by any order on any resolution of any vestry or district board in relation to the expenses of constructing works under the said two sections of the Act,” can appeal to the Metropolitan Board. That power is very constantly exercised.

3002. I think that I have called attention to the chief sections sufficiently to show that the Board has a considerable power of interference and control, so far as the vestries and district boards are concerned?—Yes.

3003. There are many other sections in the Act which you are now quoting from, and the other Acts, which give additional powers to those which I have cited?—Yes.

3004. My learned friend Mr. Pember suggested that where the Board granted a contribution under the powers of this Bill they might call upon the person to whom they granted it to pay interest upon the amount; has such a custom as that ever found its way into the practice of the Board under their powers?—No; wherever we contribute we contribute at once; when we lend the money of course they pay interest.

3005. When you make a grant in the nature of a contribution, you do not call upon the person who receives the benefit to pay the interest upon the money?—No, certainly not.

3006. The Board have, I believe, since their formation made considerable contributions to different places under their jurisdiction?—Since 1856 they have contributed no less a sum than 489,491 *l.* to different parts of the metropolis, and last year alone they contributed to local improvements 49,472 *l.*

3007. Have they made very large contributions to all the parties represented here opposing the Bill; of course, I speak as to vestries and district boards; they contribute in all parts of the metropolis?—

Mr. Littler.] One half in the City.

Witness.] The contribution is larger to the City, but the improvements for

for facilitating traffic in the City are of such a character that they are fully entitled to that larger sum, because it is there where it is absolutely necessary to widen the streets to permit the traffic to go from east to west.

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3009. Mr. *Bazalgette*.] My learned friend, Mr. Pember, suggested that the Board had reason for suspecting that the local bodies will not do their duty; that is hardly the ground which the Board takes for intervening?—That is not the ground that the Board took for intervening.

3010. May not cases exist where the action between different vestries may be somewhat a difficult matter, where intervention may become useful?—There is sometimes the greatest difficulty in getting vestries and district boards to act together. In this case it was absolutely necessary that there should be some central authority suggested to assist the local authorities.

3011. I come now to the St. Saviour's District, represented by my learned friend, Mr. Bidder; and on the question of representations made to the Board, I will ask you as to that made by the clerk of the St. Saviour's District, dated the 31st of March 1873; it is extracted from the Board's Minutes of the 4th of April 1873: "The clerk presented a letter from Mr. H. Hurney, clerk to the St. Saviour's District Board, dated 31st March 1873, calling attention to an overflow of the River Thames on the 27th ultimo, when several localities on the south side of the river were inundated, owing to the shallowness of the river bank; and urging upon this Board the desirability of undertaking or compelling the raising of the several wharves and landing-places where necessary. It was moved, seconded, and resolved, That the district board be informed that this Board have no power to comply with their request." As long ago as the 31st March 1873, did not the St. Saviour's Board ask the Metropolitan Board of Works to undertake these works themselves?—That appears from their own letters.

3012. I will repeat my question: it has been suggested that, in cases of contribution, where the request of contribution to one particular district was under consideration, the representative of that one district at the Board might favour his own place; what do you say as to that?—I have no doubt that a particular member would generally vote in favour of his own district, but that would have no effect whatever upon the rest of the Board.

3013. How many members of the Board have you?—Forty-five.

3014. Then I may take it that the 43 or 44 would be a salutary check upon the partiality of one particular member?—Yes.

3015. And that would apply in the case of a contribution to any parts of the metropolis?—The Metropolitan Board, as a rule, go and view every case where they are asked to contribute; they do not take the representations of the representatives of the district; they do not take the representations of the local authorities; they go themselves by a committee of the whole Board, or otherwise, as they think proper, and view it and see whether it is a proper one to contribute to; and we have frequently, by those means, saved thousands of pounds in contributions, and the Board have been guided in each particular instance by its own view of what is right and just as to the particular improvement.

3016. Then as regards the divisions of the Board, and the suggestion that those were frontagers upon the river who were in favour of the metropolitan incidence, and those away from the river were in favour of a different incidence: you say you do not recognise the distinction?—No, I think, taking the generality of the members, all of them, at all events after a time, know that it is their duty to consider all matters in a metropolitan sense, and not according to any local ideas; they take metropolitan views of all questions. That is the general desire of the members.

3017. Supposing that that distinction existed, it would be natural that those fronting upon the river should like the cost distributed over as large an area as possible?—There is no doubt that some of those who represent parishes on the river feel so, but there are other parishes on the river quite prepared to accept the Bill as being the exposition of the general law.

3018. You were examined as to the works which had been carried out in Holborn, and you stated that those works had been of great benefit, and had improved the rateable value of the property?—From the peculiar position of Middle Row, Holborn, by the removing of it there was a considerable

**Mr. C. M. Roche.** benefit conferred upon the back property there, but that is a very rare occasion; in fact, I believe it is the only one in London of that peculiar description.

11 June 1875.

3019. In the case of that Middle Row Improvement, while the rateable value of the property left standing was improved, was not the rateable value of the property pulled down lost to the parish?—Yes; I do not suppose the parish gained any good out of it.

3020. Therefore the improvement in rateable value would be rather confined to the houses that it benefited by the clearance?—Yes.

3021. You have been asked about Sir John Thwaites and Mr. Scott's opinions, expressed many years ago; I will not go into that. My learned friend Mr. Balfour Browne asked you, or one of my learned friends asked you, as a member of the Board, how you could have sanctioned such a defective estimate being sent in to the Committee; do you generally accept the estimates of your engineer and other responsible officers, when they make them?—I am not aware that we did accept any defective estimate.

3022. As regards the suggestion that you should overhaul the estimates, is it the practice of the Board to overhaul the estimates or work of the experts whom they employ?—I should say that the detailed estimate laid before this Committee had been submitted to the Board.

3023. I thought it was impossible that they could have been submitted?—It was a general estimate submitted to the Board of the general expense; when worked out in detail, it shows that Sir Joseph Bazalgette was right, and that it can be done for less.

3024. Even supposing that it had been submitted to the Board, should you have thought that it would be the province of the Board to overhaul the estimate, and endeavour to see whether it was accurate or not?—We should consider it; we should not take the mere statement of the officials; but supposing that Sir Joseph Bazalgette had previously stated that he thought it might amount to 100,000*l.*, and he had brought up a particular one which showed 50,000*l.*, we should be glad to have the 50,000*l.* saved.

3025. It has been suggested that there was a previous estimate of 100,000*l.*?—That was a general estimate; Sir Joseph Bazalgette has stated that in his evidence.

3026. He has also stated that a good deal of work has been executed since the first estimate was made?—Yes.

3027. That would have the effect of reducing the original estimate?—Yes, no doubt of it.

3028. **Mr. Locke.]** Can you give us the amount of the whole debt of Fulham?—I have given you all that I can give; I am not in a position to give you the whole debt of Fulham; you can get it and give it in evidence; I have applied to the accountant, and he has given me all the information that he can give me. I suppose the accountant could, by making inquiries, obtain it, and you can give it in yourself.

3029. **Sir George Elliot.]** Have you heard of many cases where the Metropolitan Board of Works have executed works, or ordered works to be executed, without contributing to such expense?—No, I do not think that there are many cases in which we do it.

3030. You have pointed out where you contribute large sums of money?—Then the locality does it, and we contribute towards it. In this case the locality should do it, and we should contribute towards it.

3031. It occurred to my mind when you were speaking of the very munificent way in which you were dealing with the districts, and I wanted to know whether this principle was new that you should direct works to be executed without finding the means and contributing towards them, and whether you have any precedents of such practice?—There is no precedent; there is no other case of flooding; it is the first case of flooding that has been brought under the consideration of the Board, and it is an exceptional matter in which we must do the best we can.

3032. **Mr. Locke.]** Can you say what you will give under the circumstances; it may be 2*d.* or it may be 1,000*l.*?—The Metropolitan Board inquire into the different cases; and the parishes generally will admit that the Board has acted with extreme liberality; the general rule would be to contribute one-half. For instance,

instance, let me take the case of something being done under this Act, and that by a little increased expenditure a great public benefit would be derived by reason of the widening of some adjacent street; the Metropolitan Board of Works under these powers might then say, spend 2,000 *l.* more in addition to what you are going to do, and we will contribute half of the cost of the works; that power has been exercised very liberally and very generally to the satisfaction of vestries and district boards.

3033. You might do it?—Yes.

3034. And at the same time you might not?—There is the power.

3035. You have the power on each side?—Yes, the Board having for 21 years exercised that power to the general satisfaction of the metropolis, I do not see why it should be now supposed that they would not exercise it with equal satisfaction.

3036. Mr. *Castle* (through the *Committee*).] Is there any other case in which the Metropolitan Board of Works have taken power to do works not only without contributing, but at the expense of private individuals or public bodies, and without giving them any option?—No, there has been no such power because there has been no such previous necessity; the necessity is here that the flooding must be prevented, and if the vestry do not do it there must be a power for the Board to go in and do the works; there has been no such previous case, and, therefore, no such previous powers.

Mr. C. M. Roche.

11 June 1877.





**A P P E N D I X.**

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**D R A W I N G S**

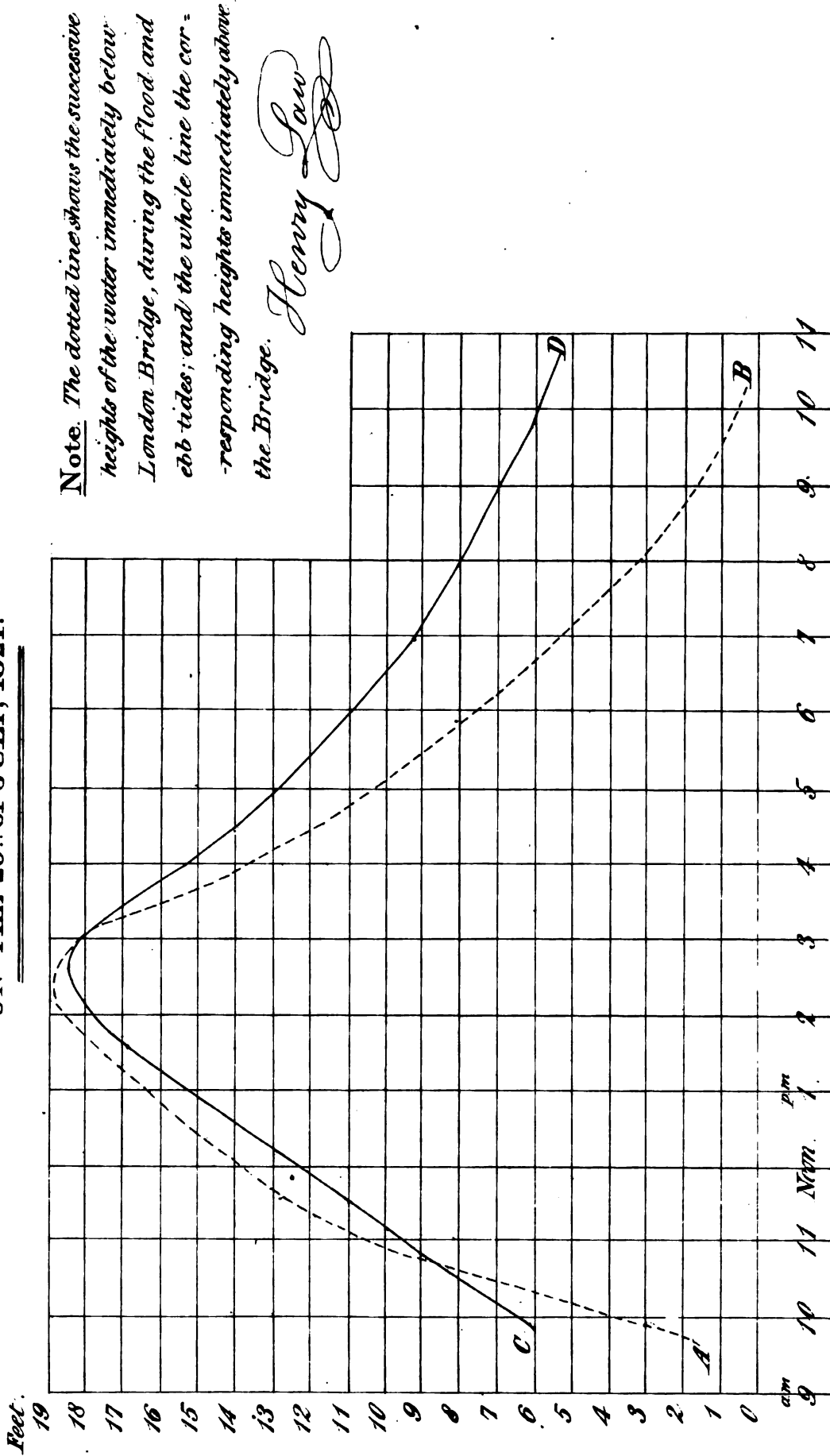
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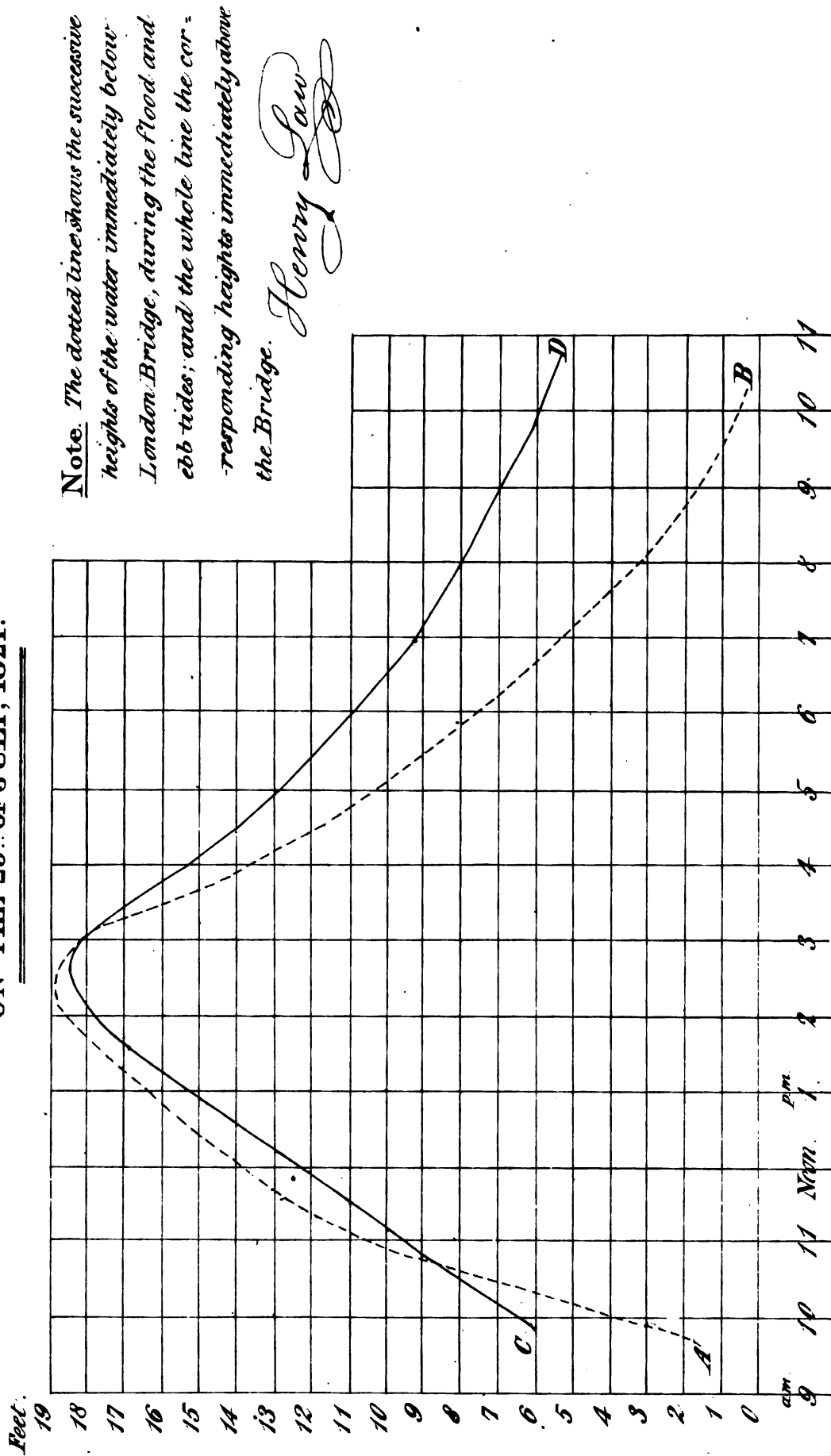


DIAGRAM SHOWING THE RISE AND FALL OF THE TIDE  
AT OLD LONDON BRIDGE,  
ON THE 29<sup>th</sup> OF JULY, 1821.





**DIAGRAM SHOWING THE RISE AND FALL OF THE TIDE  
AT OLD LONDON BRIDGE,  
ON THE 29<sup>th</sup> OF JULY, 1821.**







# OBSERVATIONS ON THE RELATIVE HEIGHTS OF THE TIDE ABOVE AND BELOW LONDON BRIDGE,

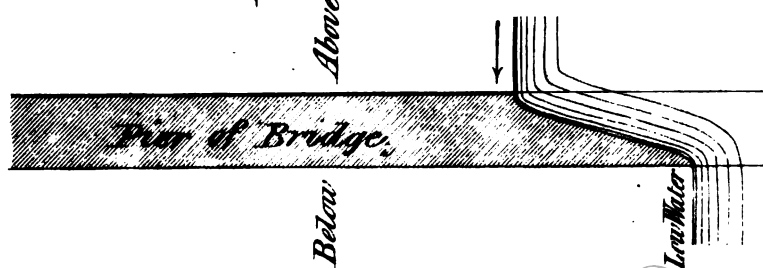
TAKEN ON THE 29<sup>TH</sup> OF JULY, 1821.

Henry Law

*Fig. 1.*

*At 9.30 a.m.*

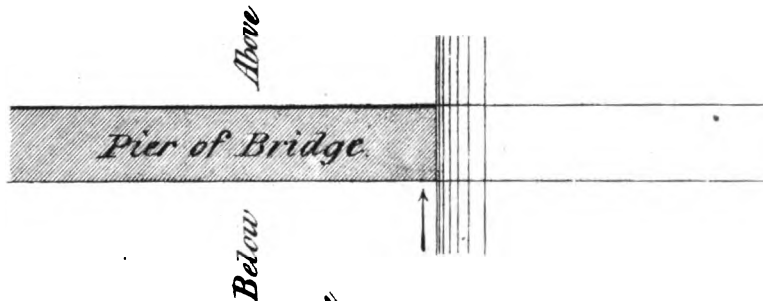
*Fall '52.*



*Fig 2.*

*At 10 A.C. a.m.*

*Level:*



*Fig. 3.*

*At Nccn,*

*Fall 16.*

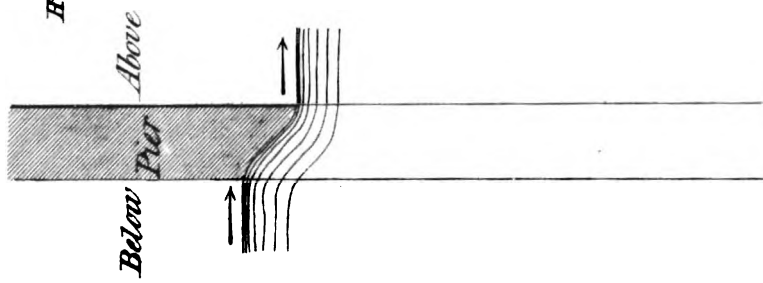
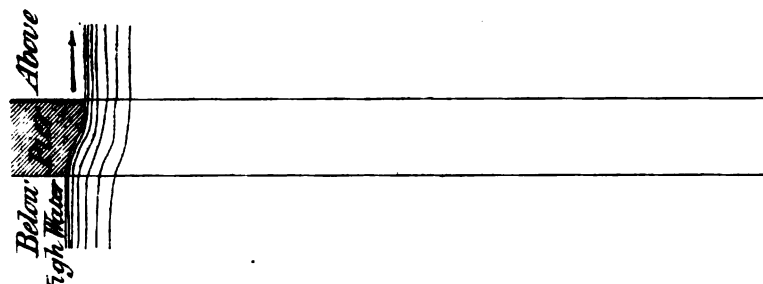


Fig. 4.

*At 2.18.p.m.*

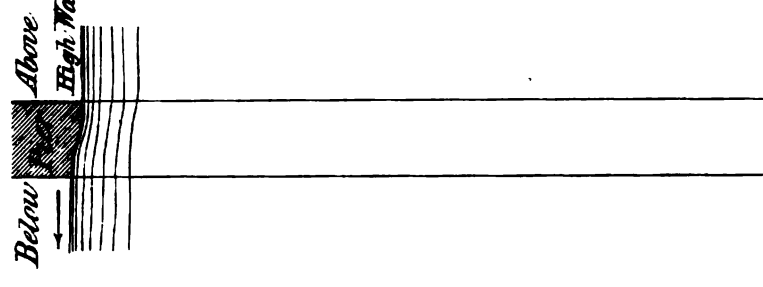
*Fall 7 ins.*



**Fig. 5.**

*At 2.35 p.m.*

*Fall 4ins.*



**Fig 6.**

*At 3.10. p.m.*

*Level:*

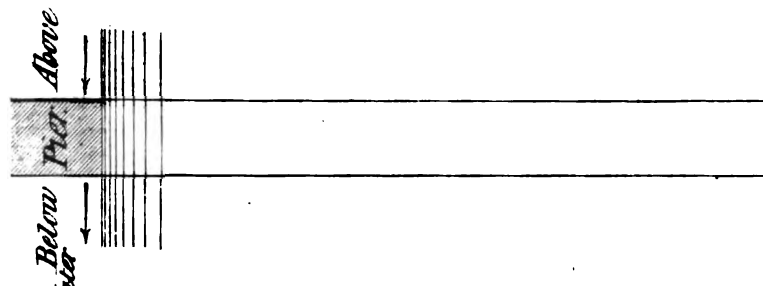


Fig. 7.

*At 6.0. p.m.*

Fall 35.

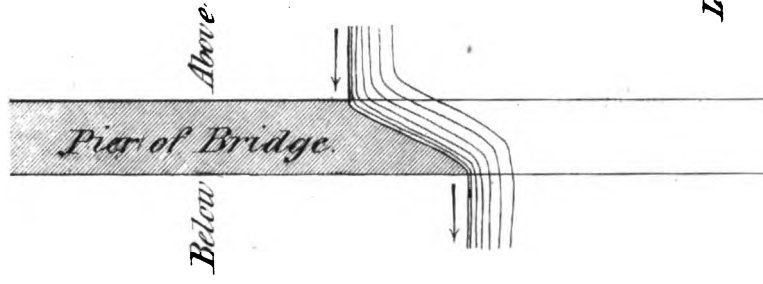
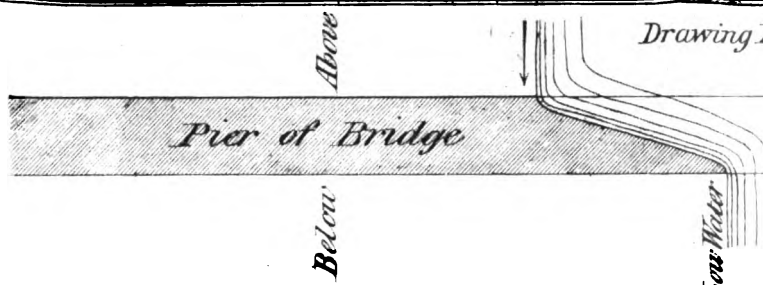


Fig. 8.

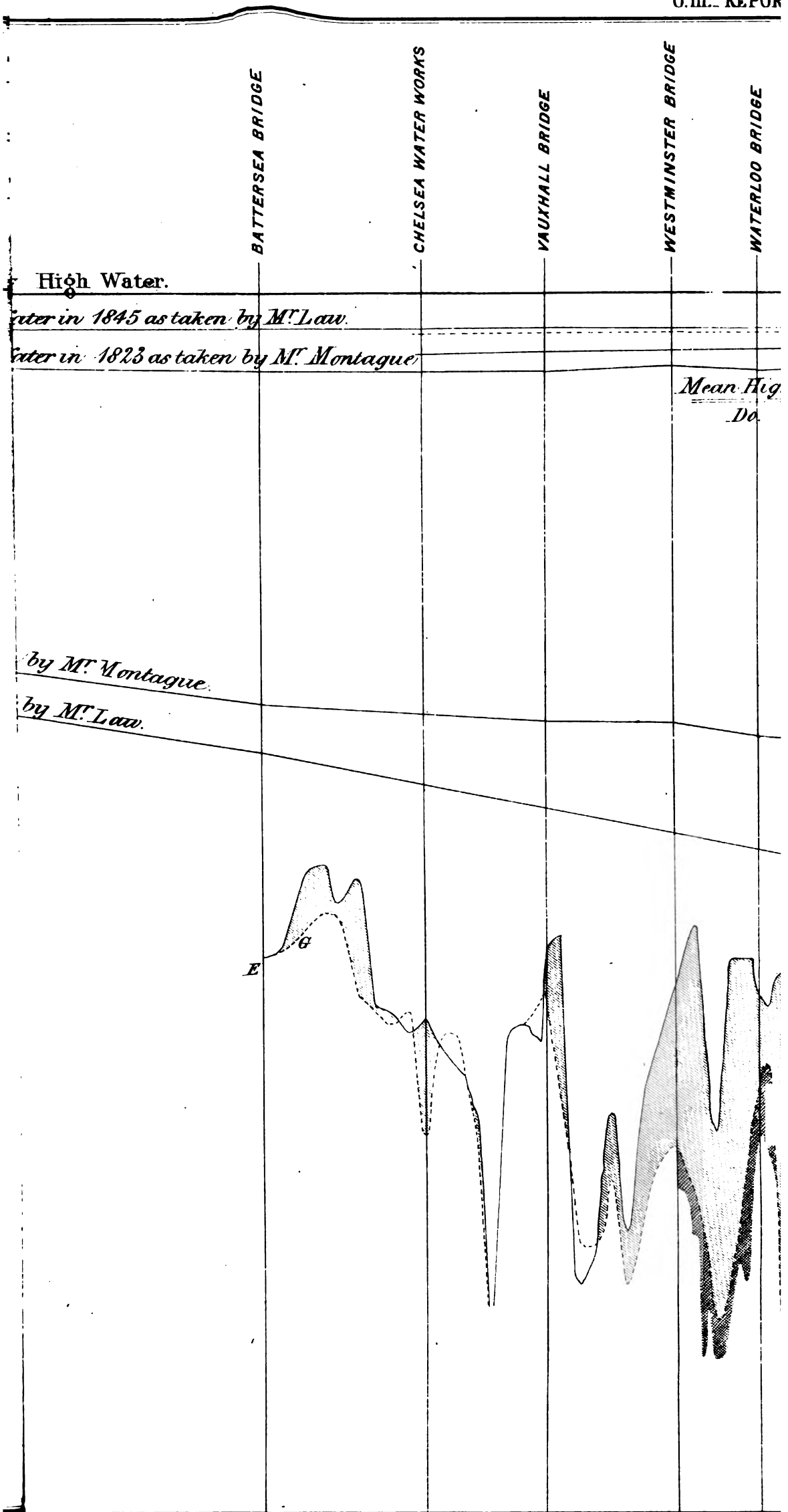
*At 10.27.p.m.*

*Roll 54:*

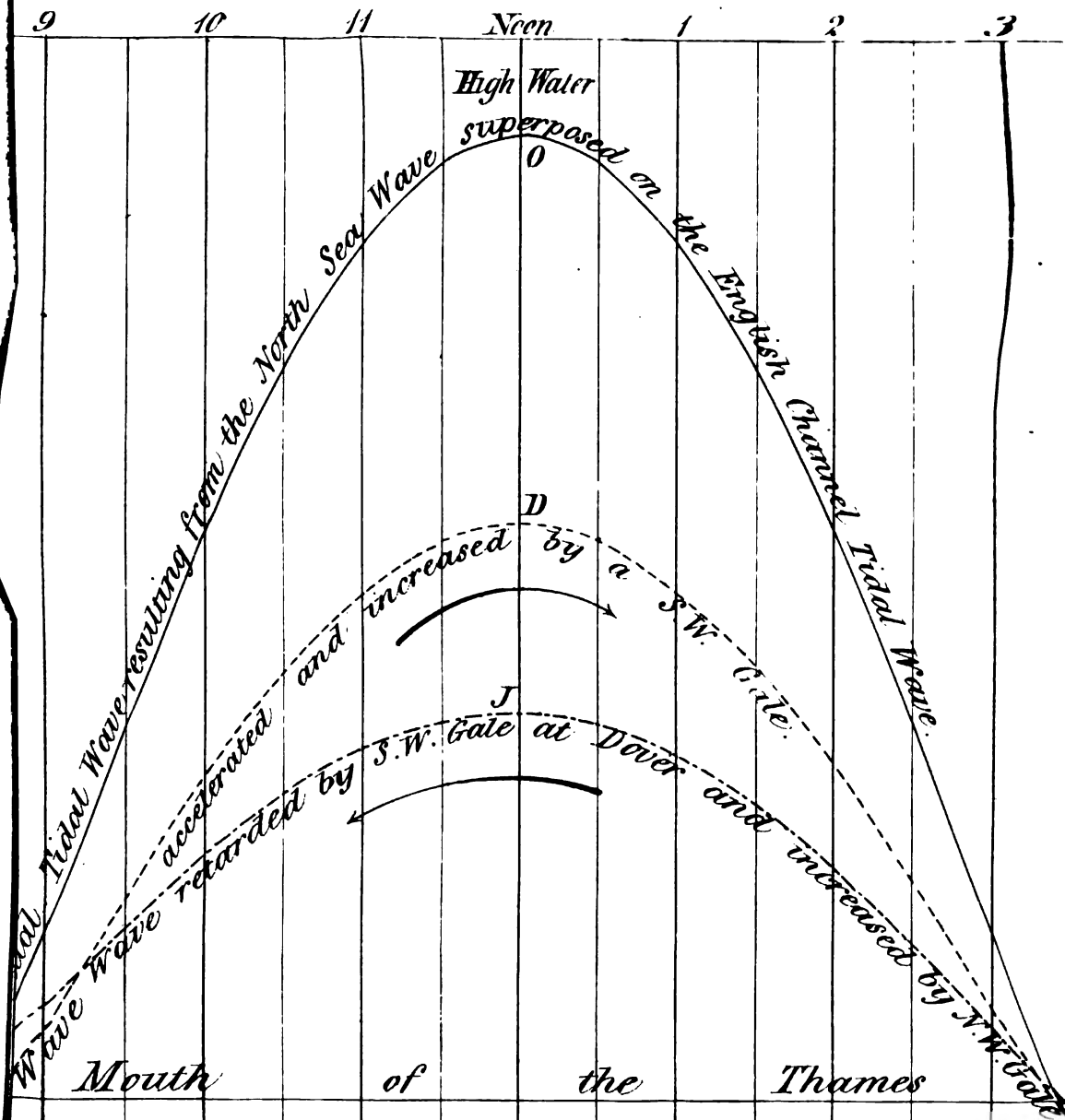


*Drawing 1*





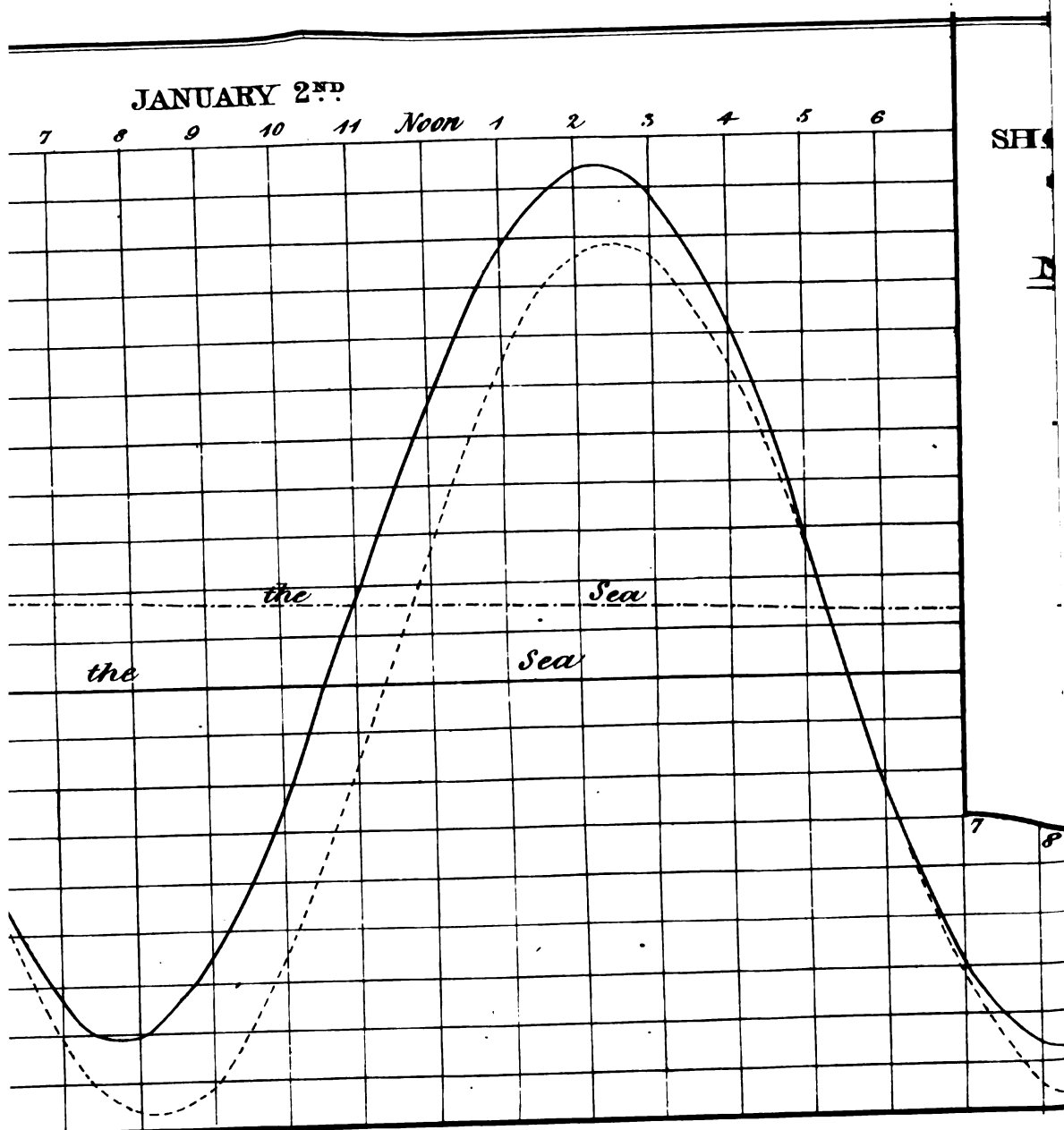


*Extraordinary Spring Tide.*Note.

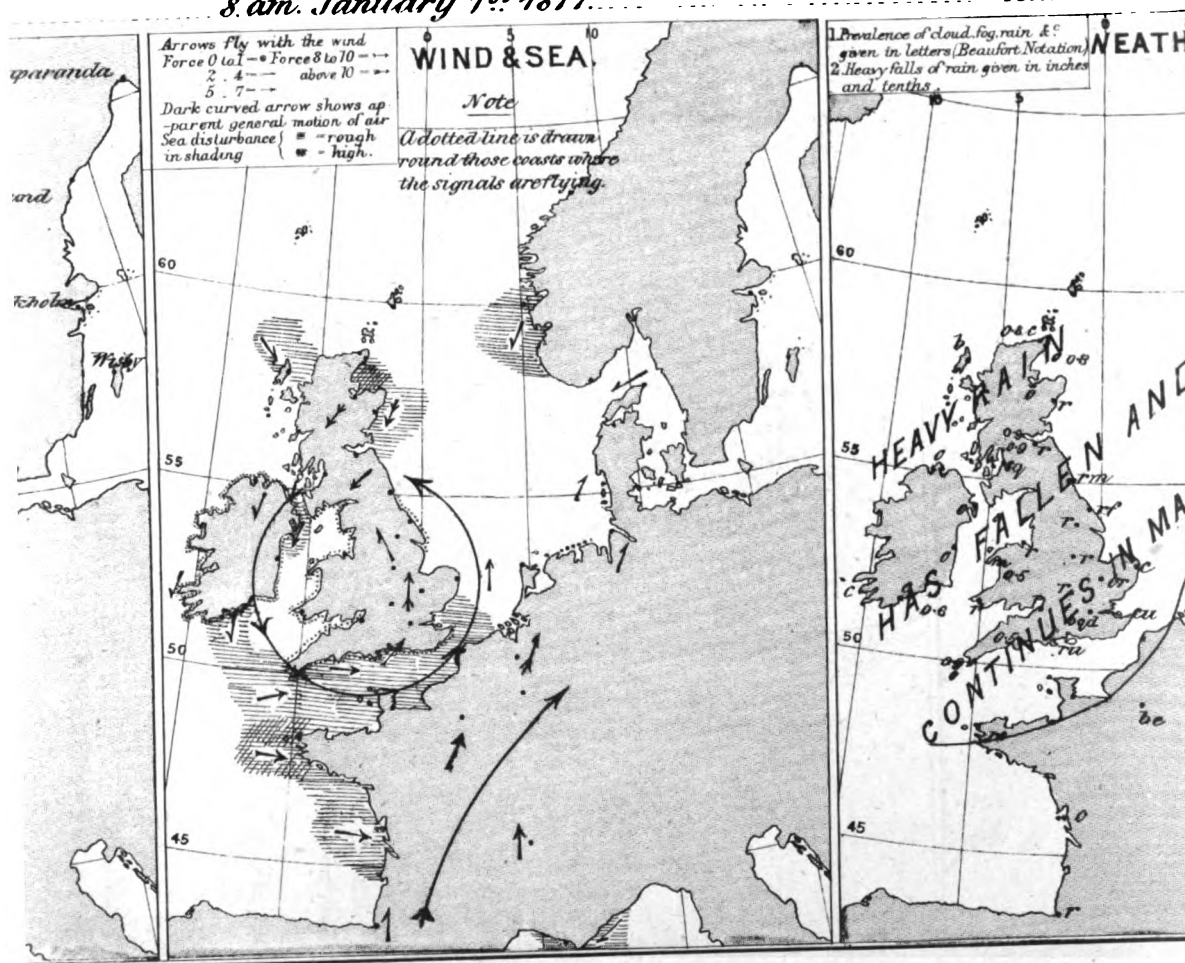
The height of the actual Tidal Wave at any given moment above the mean level of the Sea is the sum of the heights of the North Sea Tidal Wave and of the English Channel Tidal Wave above the mean level of the Sea at that same moment added together.

Henry Law





*8 am. January 1<sup>st</sup> 1877.*





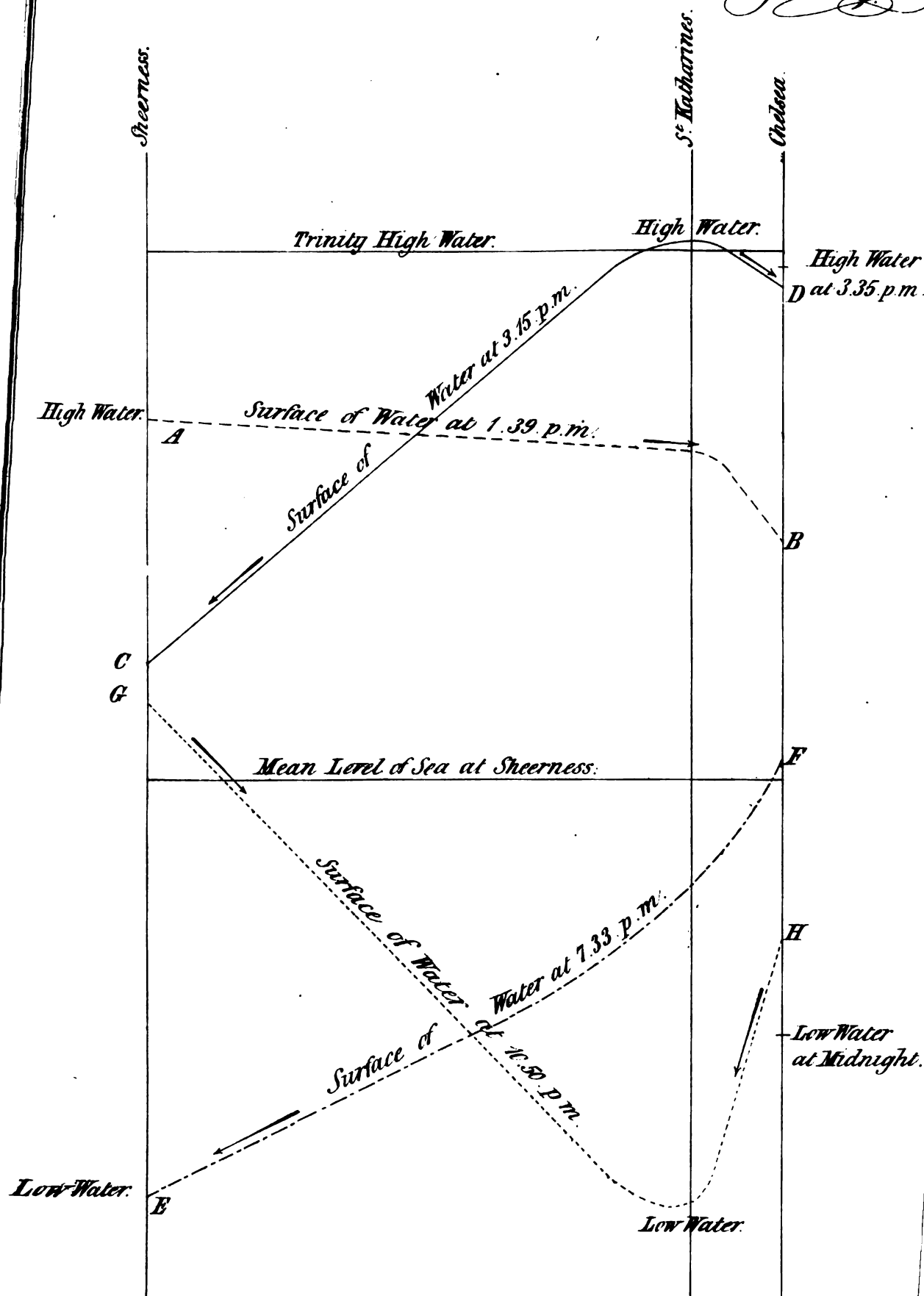


Drawing N<sup>o</sup> 6.

DIAGRAM SHOWING THE CONTEMPORANEOUS LEVELS OF THE THAMES  
AT SHEERNESS, ST. KATHARINE'S DOCKS AND CHELSEA,  
ON THE 17<sup>TH</sup> OF MARCH. 1843.

Vertical Scale, 1 inch equal 3 feet.

*Henry Law*



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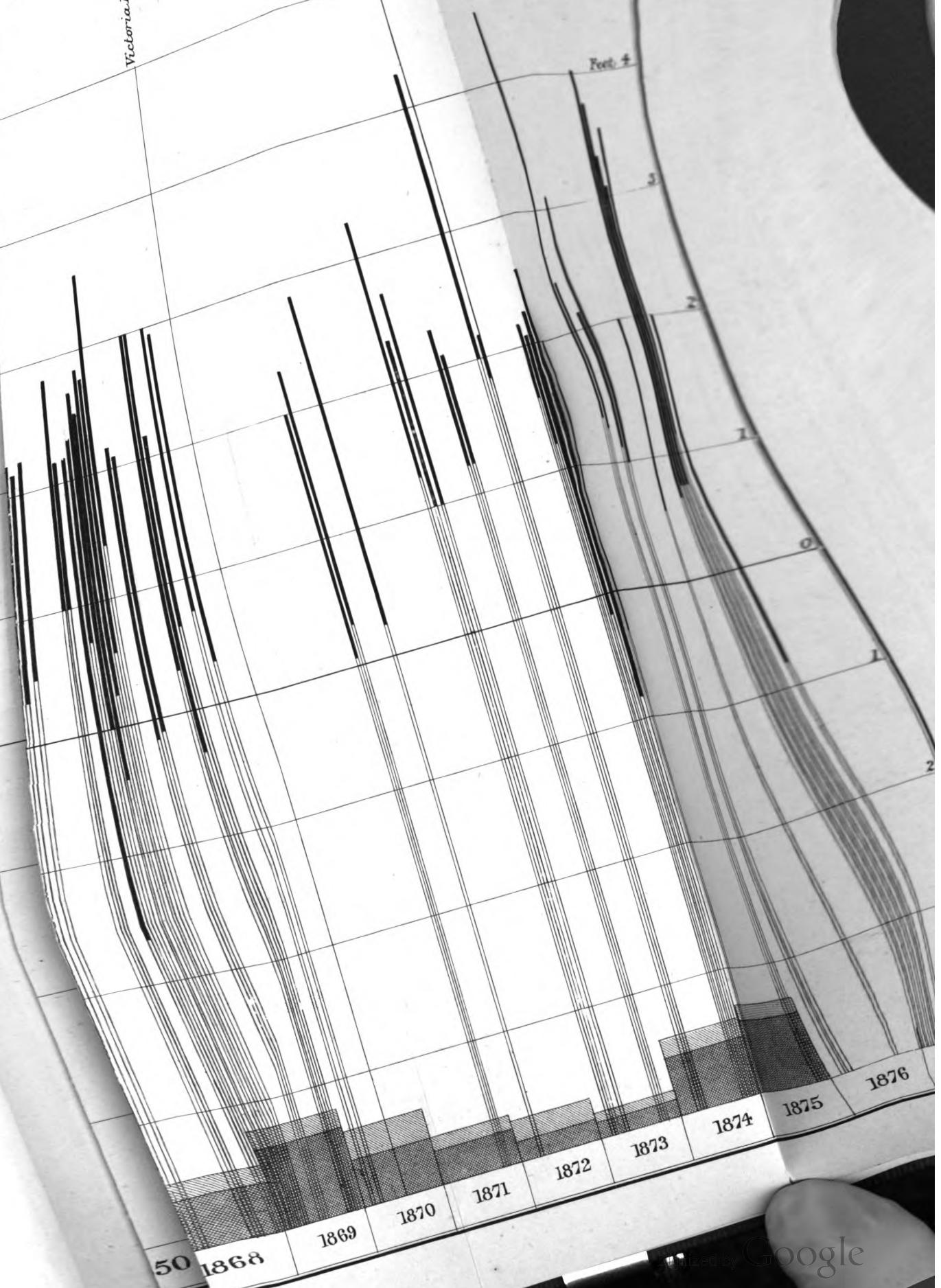
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Victoria Embankment completed

Chelsea Embankment completed

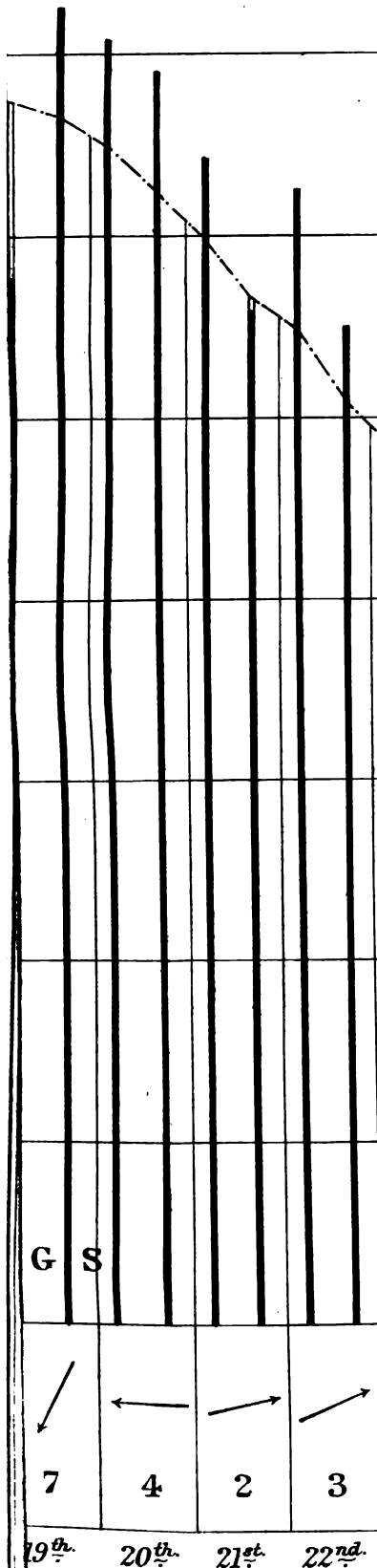




*Drawing N<sup>o</sup> 8.*

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**R E P O R T.**

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**Thames River (Prevention  
Floods) Bill.**

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*Ordered, by The House of Commons, to be Printed,  
21 June 1877.*

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[*Price 8 s.*]

280.

Under

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ON

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*Ordered, by The House of Commons, to be Printed,*  
*21 June 1877.*

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I N D E X.

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Report by witness, dated 20th March 1876, adverted to as showing the difficulty of making any reliable estimate of the cost of the proposed inundation works, though probably not one-tenth the cost of granite embankments, 417-421. 451, 452—Small cost at which the required works might be completed if executed by the individual owners, as compared with the cost if executed by a public body like the Metropolitan Board, 422-425. 451, 452.

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Examination as to the river frontage of Fulham, and as to the effect of inundation works if confined to that part of the frontage within the metropolitan area, 453-468—Considerable extent of new bank constructed, or in course of construction, in Fulham by private parties; failure of some bank-work previously executed by market gardeners, 472-484—Probable cost of 300,000*l.* for a continuous embankment in Fulham, whereas floods can be effectually prevented at a very small cost, 485-489.

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Inability of witness at present to describe the actual works required or to distinguish between those which are more or less costly, 558-564—Belief as to the area of St. Saviour's district being small in proportion to its long river frontage, 565-572.

Statement as regards Messrs. Cory's wharf, that it would not be necessary to raise the whole frontage three feet, 576-585—Contemplated use of sliding doors by Messrs.



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Cory, though witness is not now prepared with any particular scheme in this case, 586-593—Probable necessity of rebuilding some of Messrs. Cory's premises if it devolved upon a public body to carry out the required works, and at the same time to meet the requirements of the proprietors, 588, 589, 594, 595—Several instances of wharfingers having already executed works so as to prevent flooding through loopholes, &c., 598-602.

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Short distance for which the Wandle, near the Thames, is tidal; witness has made no estimate of the works required in this district, 622-631—Statement showing the extent to which sufficient works have already been constructed along the river front from Nine Elms to Battersea and Wandsworth, 632-652—Expected sufficiency of the proposed works for many years to come, though in course of time still higher tides may occur requiring some additional works, 653-655.

Similar level to which it is proposed that all the walls, &c., shall be raised, 656, 657—Necessity, as regards the Wandle, either of raising the banks or excluding the tide; general power under the Bill for applying precautions in this case, as by means of flood-gates, 658-672.

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Statement as to the Metropolitan Board having never put in operation their power under Clause 69 of the Act of 1855; legal advice taken by the Board in the matter, 721-726—Further explanation in regard to the Board having taken powers to carry out the main drainage scheme without previously submitting any plans, 727-732—Provisions and facilities for the adjustment of expenses according to the benefit derived by each district, whether with a frontage to the river or not, 733-737.

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[Third Examination.]—Further evidence as to the inappreciable effect of the Thames Embankment in raising the height of the tide in parts of the river above the embankment, 767-772—Inaccuracy of the assumption that certain parts of Fulham would probably be flooded as a result of embankment lower down the river, 773.

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Explanation that witness will be prepared in a few days to submit an approximate estimate of the cost of the works to be done, and to explain the character of each work, 780-799—Doubt as to any greater obstruction to trade by the works remaining to be carried out than by those already completed voluntarily by the parties, 800, 801.

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[Fourth Examination.]—Great detail involved in the preparation of the plans and estimates of the necessary works, these extending over forty-two miles frontage of the river, 1532—Witness undertakes to supply plans and estimates for the information of parties in a position to the Bill by the end of May; sections can be supplied separately for different districts, 1532-1536.

[Fifth Examination.]—Since his last examination witness has supplied the parties interested with sections and schedules of the works required on their premises, and with estimates of the cost, 1541-1544 — Summary of the estimated cost of the works in each parish or district; total of 18,200*l.* on the north side, and of 31,800*l.* on the south side, 1545—Illustration in the case of Wandsworth district of the varied character of the works required according to the schedule, *ib.*

Inability of witness to supply any estimate of the cost of compensation, 1546-1548 — Circumstance of witness not having made any detailed estimates of cost till recently, though he had formed an idea as to the amount, 1549, 1550. 1628-1634 — Further admission as to there being nothing in the Bill to limit the discretion of the Metropolitan Board as to the extent of the works, 1551-1554. 1635-1638 — Conclusion as to the sufficiency of the sums allowed for raising river-side walls, as in Lambeth, 1555-1557.

Defence of the course pursued in not supplying the opponents of the Bill with more detailed plans and sections, though it will be necessary to prepare these if the Bill be passed, 1559-1566. 1639-1644 — Expectation that heavy claims for compensation may be made, there being, however, no good foundation for them, 1567-1574.

Examination as regards the works proposed at Messrs. Dowson's Wharf in Limehouse, that witness has not considered the details necessary for preventing obstruction to the business of the wharf, but concludes that any claim for compensation may be obviated by a modification of the works, 1575-1590. 1593-1603 — Satisfactory action of the Limehouse Board in taking precautions for the prevention of floods in the district, 1604-1607 — Conclusion as to Messrs. Dowson's Wharf having been flooded, its level being only three feet above Trinity high-water mark, 1608-1613 — Inappreciable difference in the height of the tide in different parts of the river, 1614, 1615.

Statement of the extent to which the river walls in Limehouse are proposed to be raised, 1616-1621 — Power of the authorities under the Bill to require the wharfingers and owners to keep the walls and works in order and repair, 1622, 1623 — Objection to the local authorities being still left, as under the Metropolis Act of 1855, to provide the required remedies, instead of the matter being under the control of a central body, 1624-1627 — Contemplated modification of the works proposed by witness accordingly as the Metropolitan Board may find necessary on further investigation, 1635-1638. 1804-1806.

Further evidence as regards the question of compensation to the effect that witness fully expects the claims will be heavy, but the foundation for them very light, 1645-1668 — Reference to witness' Report of 20th March 1876, as not really estimating the cost at 500,000*l.* or 600,000*l.*, if done by the individual owners, 1656-1658. 1680-1684 — Circumstance of the Metropolitan Board not being liable under the Bill to pay any compensation that may be found necessary, 1669-1673.

Statement as to its having been found impossible, within the time allowed, to supply the Conservancy Board with complete plans of the whole works proposed; facility given to the Board to inspect the plans in witness' office, 1674-1679.

Patchwork appearance of the proposed works as compared with a uniform embankment, 1680, 1681. 1697-1699 — Explanation that a large portion of certain extra works, which witness roughly computed in March 1876 would cost 100,000*l.*, has since been done by the dock companies and others, and that the remainder is included in witness' present estimate, 1685-1693 — Information in detail in connection with the various works proposed in the Fulham district from one end of the river frontage to the other, 1694-1791.

Proposal as to raising by two feet an earthen bank in the Fulham district, 2,800 feet long, standing back some distance from the river; objection to a new bank instead, close to the river, so as to reclaim a large area covered at high-water, 1701-1726. 1786-1788 — Reference to a public footway near the river which has already been raised to the required height by the Fulham Local Board; apparently large cost incurred, 1727-1729. 1741-1745. 1750-1752 — Safety with which certain river-side walls in Fulham may be raised, 1759-1780.

Circumstance of the estimated cost in Wandsworth district being more than half that for the whole north side of the river, 1792-1794 — Modifications proposed by witness in the plan first contemplated for dealing with the Wandle; estimate of 3,000*l.* for the works now suggested, 1795-1806 — Object of the works on the Wandle to prevent flooding from the Thames, floods from the Wandle itself not being dealt with, 1807-1812.

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*Bazalgette, Sir Joseph.* (Analysis of his Evidence) — continued.

1812-1814 — Proposed construction of a new parapet wall five feet high in front of the brewery in Wandsworth, 1808-1811.

Examination as to the proposed construction of walls two feet high upon certain fruit wharves near London Bridge on the north side; belief that the trade would not be seriously interfered with thereby, and that the cost estimated will be found sufficient, 1813-1838 — Information also relative to a wall proposed at Queenhithe and Smith's Wharf; limited obstruction thereby, 1839-1867.

Belief that at certain wharves on the Surrey side, near London Bridge, steps have already been taken by the parties interested for keeping out floods, so that witness has not included these places on the plans now under consideration, 1848-1868 — Examination upon the question of preventive measures having been taken, or being required, at Chamberlain's Wharf; letter from the occupiers on the subject, 1848-1855, 1858-1861 — Precautions adopted at Cotton's Wharf in view of high tides, 1856, 1857 — Belief as to certain precautions having also been taken at the Gun and Shot Wharf, 1862-1868.

Proposal for placing a wall three feet high along the wharf at Bankside west of Southwark Bridge; this would be composed of brick in some places, and of timber in others, 1869-1877 — Statement as to witness not proposing to raise the whole surface of this wharf by three feet; limited inconvenience in getting goods over the frontage wall, 1878-1889 — Contemplated use of a slide board in the wall at Reddin's dust wharf, Bankside, 1890-1897 — Expediency of power to impose a fine in the event of slide boards being out of their place, except when business is being carried on, 1898-1901 — Explanation in reference to the mode proposed for dealing with Newton's draw dock, Bankside, 1902-1908.

Date of the survey of St. Olave's district upon which witness has estimated that the required works may be provided for 200 £.; permanent character of these works, though in course of time a different class of works may be rendered necessary, 1909-1918, 1925-1932 — Expediency of power to enforce the proposed works in St. Olave's, though of only a small and inexpensive character, 1919-1927.

Explanation of the details proposed as regards Messrs. Cory's wharf, witness representing that the works will not be an obstruction to business; difficulty as to these details being submitted to Messrs. Cory, 1933-1947 — Large number of moveable slides to be used in the Lambeth district, 1948-1954.

Absolute necessity of steps being taken by some authority or other for the prevention of floods, 1956 — Belief that the works recommended by witness combine economy and efficiency; if acting for the district boards or other local authorities he would have proposed precisely the same works, 1957-1968 — Liability to claims for compensation whether the works are undertaken by the Metropolitan Board, or by the local authorities, 1969-1971 — Opinion that any compensation awarded will be light, 1972-1974.

Large proportion of the works required on the south side of the river, especially in Wandsworth; unfairness on this score of spreading the charge over the metropolis, 1975-1980 — Power of the Metropolitan Board to contribute towards the cost in Wandsworth, or any other district, 1981-1983 — Necessity of new works in Fulham, upon whomsoever the cost is to fall, 1984, 1985 — Opinion that, as regards cost, more than half the necessary work has already been done effectually, 1986-1990 — Contemplated consultation with the owner in each case before any work is undertaken, 1991-1993.

*Blackfriars Bridge.* Increase in the sectional area through Blackfriars Bridge, by the substitution of the new for the old bridge, *Law* 837 — Entire removal of old Blackfriars Bridge by the end of 1867, *ib.* 1538.

*Bridges.* Effect of new London Bridge, and new Westminster and Blackfriars Bridges, in allowing a larger volume of tidal water to pass up the river; improvement of the navigation thereby, *Sir J. Bazalgette* 50. 133-145.

See also *Blackfriars Bridge.*      *London Bridge.*      *Westminster Bridge.*

## C.

*Chamberlain's Wharf.* Examination upon the question of flood-preventive measures having been taken, or being required, at Chamberlain's Wharf; letter from the occupiers on the subject, *Sir J. Bazalgette* 1848-1855, 1858-1861.

*Chelsea Embankment.* See *Thames Embankment.*

*Chiswick.* Necessity of raising the banks in Chiswick as well as in Fulham, *Abernathy* 1251-1257.



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*City of London* Estimate of 700 l. as the cost of the inundation works required in the City, *Sir J. Bazalgette* 1545.

*Clyde, The.* Considerable increase in the tidal height of the Clyde, through the removal of the shoals, *Abernethy* 126c-1264.

*Compensation.* Heavy claims for compensation which are likely to be made if the works are carried out directly by the Metropolitan Board, *Sir J. Bazalgette* 676-679 — Opinion that the wharfingers have no good claim to compensation, *Abernethy* 1265-1267.

Inability of witness to supply any estimate of the cost of compensation, *Sir J. Bazalgette* 1546-1548 — Expectation that heavy claims for compensation may in many cases be made, there being however no good foundation for them, *ib.* 1567-1574.

Further evidence as regards the question of compensation to the effect that witness fully expects the claims will be heavy, but the foundation for them very light, *Sir J. Bazalgette* 1645-1668 — Circumstance of the Metropolitan Board not being liable under the Bill to pay any compensation that may be found necessary, *ib.* 1669-1673 — Liability to claims for compensation, whether the works are undertaken by the Metropolitan Board, or by the local authorities, *ib.* 1969-1971 — Opinion that any compensation actually awarded will be light, *ib.* 1972-1974.

Precedent in the case of the main drainage for the omission in the present case to make any estimate of the cost of compensation, *Roche* 2112-2123 — Grounds for the conclusion that it would be impracticable to furnish an estimate in regard to compensation, *ib.* 2144-2147. 2153-2155. 2173-2175. 2527-2530 — Probability of larger claims for compensation if the works were done at the cost of the Metropolitan Board, *ib.* 2148-2152.

Expediency of the provision that any compensation which may be awarded shall be paid by those liable for the construction of the works, *Roche* 2156-2160. 2178-2182 — Inexpediency of providing that compensation cannot be claimed; reference hereon to a report on the subject by the Board's solicitor, *ib.* 2183-2188.

Explanation that the ratepayers of any parish in which the works might entail a heavy charge for compensation would not be affected thereby, *Richardson* 2731, 2732.

*Compulsory Powers.* Want of power under an Act of Parliament (as now proposed) for enforcing the raising of the frontage or the provision of tide boards, and for applying an effectual supervision, *Sir J. Bazalgette* 88, 89. 92. 98. 104 — Conclusion as to the absolute necessity of the proposed compulsory powers in the Metropolitan Board as regards the execution and supervision of the required works, *ib.* 104 — Necessity of taking power to execute works, though it is not contemplated that the Board shall execute them, *ib.* 168-173.

Precedent in the Main Drainage Act for the proposed power of taking lands compulsorily, as required for the necessary works, *Sir J. Bazalgette* 207-218 — Conclusion that it is essential to have a power of taking lands compulsorily, though witness is not prepared to specify any cases in which the exercise of such power will be necessary, *ib.* 231-240.

Witness considers that a compulsory power in the Metropolitan Board is necessary in order that the required works may be carried out by the wharfingers and owners in a complete manner, *Law* 875-877 — Conclusion as to the insufficiency of the legislation now in force for the prevention of floods, inasmuch as the necessary works have not been done, *ib.* 1045-1047 — Opinion as to the expediency of full power to acquire land, &c., although witness considers the works generally will be of a comparatively trivial character, *ib.* 1056-1058.

Power taken by the Board under the Bill to make orders for the guidance of the local authorities, and to prescribe the works to be carried out, *Roche* 2023-2027 — Necessity of the power taken by the Bill enabling the parties to acquire land and to enter upon land for the purpose of the necessary repairs, *ib.* 2031-2034 — Explanation in further reference to the provisions for taking land compulsorily; necessity of plans being deposited and notices given, *ib.* 2531-2536.

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*Cory & Son, Messrs.* Statement, as regards Messrs. Cory's wharf, that it would not be necessary to raise the whole frontage three feet, *Sir J. Bazalgette* 576-585 — Contemplated use of sliding doors by Messrs. Cory, though witness is not now prepared with any particular scheme in this case, *ib.* 586-593.

Probable necessity of rebuilding some of Messrs. Cory's premises, if it devolved upon a public body to carry out the required works, and at the same time to meet the requirements of the proprietors, *Sir J. Bazalgette* 588, 589. 594, 595 — Benefit to all the land behind Messrs. Cory's wharf, which is below the level of high tides, by the proposed works, *ib.* 603-611.

## Report, 1877—continued.

*Cory & Son, Messrs.*—continued.

Explanation of the details proposed as regards Messrs. Cory's wharf, witness representing that the works will not be an obstruction to business; difficulty as to these details being submitted to Messrs. Cory, *Sir J. Bazalgette* 1933-1947.

## COST OF WORKS:

1. *As to the probable Cost.*
2. *As to the Incidence of the Expense.*
3. *As to the Metropolitan Board contributing in aid of the Localities.*

1. *As to the probable Cost:*

Report by witness, dated 20th March 1876, adverted to as showing the difficulty of making any reliable estimate of the cost of the proposed inundation works, though probably not one-tenth the cost of granite embankments, *Sir J. Bazalgette* 417-421, 451, 452—Small cost at which the required works might be completed, if executed by the individual owners, as compared with the cost if executed by a public body like the Metropolitan Board, *ib.* 422-425, 451, 452.

Reference to a rough estimate by witness that the cost of certain works would not exceed 100,000*l.*; less outlay involved in the works under the Bill, for which, however, he has made no detailed estimate, *Sir J. Bazalgette* 543-546, 551, 553-557—Conjectural character of witness' general estimate of the cost, he not having made any detailed estimate for each separate work, *ib.* 749-751—Simple and inexpensive character of the proposed works as compared with the embankment works; nothing of the latter kind is in contemplation, or is required, *ib.* 752-757.

Explanation that witness will be prepared in a few days to submit an approximate estimate of the cost of the works to be done, and to explain the character of each work, *Sir J. Bazalgette* 780-799.

Small expense of the works remaining to be constructed, much having been already done voluntarily by owners and others, *Law* 885—Opinion formed, upon a careful examination of the Thames, that efficient works for the prevention of floods may be constructed at a comparatively small cost, *Abernethy* 1207-1209, 1250—Insignificant character of the works required; rough estimate of 80,000*l.* as sufficient for the purpose, *ib.* 1250—Inexpensive character of the works necessary for the prevention of overflows, *Barlow* 1380-1390.

Summary of the estimated cost of the works in each parish or district; total of 18,200*l.* on the north side, and of 31,800*l.* on the north side, *Sir J. Bazalgette* 1545—Circumstance of witness not having made any detailed estimates of cost till recently, though he had formed an idea as to the amount, *ib.* 1549, 1550, 1628-1634—Conclusion as to the sufficiency of the sums allowed for raising riverside walls, as in Lambeth, *ib.* 1555-1557.

Reference to witness' report of 20th March 1876 as not really estimating the cost at 500,000*l.* or 600,000*l.*, if done by the individual owners, *Sir J. Bazalgette* 1656-1658, 1680-1684—Explanation that a large portion of certain extra works, which witness roughly computed in March 1876 would cost 100,000*l.*, has since been done by the dock companies and others, and that the remainder is included in witness' present estimate, *ib.* 1685-1693—Opinion that as regards cost more than half the necessary works has already been done effectually, *ib.* 1986-1990.

Explanation as to detailed estimates of cost not having been submitted to the Board, *Roche* 2483-2486—Data for concluding that Sir Joseph Bazalgette's estimate of 50,000*l.*, as the cost of the works remaining to be done, is not defective; investigation of the estimate by the Board, *ib.* 3021-3027.

2. *As to the Incidence of the Expense.*

Explanation in reference to Clause 19 of the Bill, and the proposal therein as to the modes in which the local board or vestry may charge the cost of works, *Sir J. Bazalgette* 173-175—Concurrence in the view that districts benefited by the works, other than riverside districts, should, as well as the latter, contribute to the cost, *ib.* 202-206—Absolute discretion proposed to be exercised by the Metropolitan Board in the apportionment of cost where a work is executed jointly by different parishes, *ib.* 219-222.

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Statement with further reference to the discretion exercised by the Metropolitan Board in determining whether an improvement is of a metropolitan or a local character, and is to be charged on the metropolitan rates or on the locality, *Sir J. Bazalgette* 490-510 — Further expression of the opinion that the frontagers may reasonably be called upon to do the works at their own expense, *ib.* 619-621 — Unfairness if those parties who have already gone to the expense of new works, in consequence of the circular of the Board, be called upon to contribute to the cost of the works remaining to be done in other localities, *ib.* 680-687.

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Examination upon the question whether the majority at the Board in favour of throwing the cost upon the localities benefited does not consist of representatives of districts not on the river, and the minority opposed thereto of representatives of river-side districts; exception taken to this argument, *Roche* 2296-2338.

Reluctance of witness to offer any opinion upon the question whether the Board could fairly be called upon to pay for preventive works even if the Board had contributed by the Embankment or otherwise to the necessity for such works, *Richardson* 2748-2757, 2874-2876.

Rejection by the Committee (by a majority of seven to three) of the proposal in the Bill as to the mode of charging and meeting the expenses of preventing floods,  
*Rep. xi.*

Resolution adopted by the Committee that the most equitable mode of charging and meeting the expenses to be incurred for the prevention of floods within the metropolitan district would be that the works should be carried into effect by the Metropolitan Board and the expenses paid by a rate levied over the whole metropolitan area, *Rep.* v. xi, xii.

Rejection of proposal that the cost of works carried out in any district be charged one-half to the district board, and one-half to the Metropolitan Board, *Rep.* xi, xii.

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## COST OF WORKS—continued.

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<i>Drainage.</i>	<i>Metropolitan Board of Works.</i>	<i>Newington.</i>	<i>Owners.</i>	<i>Sea</i>	
<i>Walls.</i>	<i>Sewers (Metropolis).</i>	<i>Southwark.</i>	<i>Street Improvements.</i>	<i>Wandsworth.</i>	

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*Counter Creek and Ravensbourne Works.* Explanation relative to the action of the Metropolitan Board, in placing upon the metropolis at large certain expenses formerly incurred in respect of Counter Creek Works, and Ravensbourne Works, *Richardson* 2670-2675. 2851, 2852.

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## D.

*Damage from Floods.* Great damage done to river-side houses in Lambeth and elsewhere by the flood of 2nd January 1877, whereas the mischief might have been prevented by slight precautions, *Sir J. Bazalgette* 64-66—Immense amount of damage done by a comparatively small overflow of the tidal wave, *Barlow* 1520-1522.

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*Draft Bill.* Statement that a draft of the Bill, before it was considered by the Parliamentary Committee of the Board, is not the same that was circulated among the members; comment upon the action of the Fulham member of the committee in reference to this document, *Roche* 2383-2387.

*Drainage (Thames Valley).* Tendency to increased height at high-water by the improved drainage of the Thames Valley, the rainfall reaching the river more rapidly, *Law* 857, 858; *Abernethy* 1196; *Barlow* 1354-1357. 1379. 1428-1437. 1510-1512.

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*Effra River.* Circumstance of the former Effra river being now a sewer, and being closed, *Sir J. Bazalgette* 528. 537-539.

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**FULHAM:**

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**G.**

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*Gun and Shot Wharf.* Belief as to certain precautions having been taken at the Gun and Shot Wharf, *Sir J. Bazalgette* 1862-1868.

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*Harrow-road Improvement.* Explanation as to the Harrow-road improvement in Paddington parish having eventually been dealt with and charged as a metropolitan instead of a local improvement; part taken by witness in bringing about this result, *Roche* 2421-2438—Statement as to the Harrow-road improvement having been dealt with as a metropolitan improvement; witness does not admit that this is analogous to the case of local inundation works near important thoroughfare, *Richardson* 2791-2807. 2882-2890.

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*Law,*

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[Third Examination.]—Explanation that it was not till the end of 1861 that the obstruction caused by old Westminster Bridge was entirely removed, though the new bridge was partially opened in March 1860; 1537, 1538—Entire removal of old Blackfriars Bridge by the end of 1867; 1538—Lapse of some time after the opening of the new bridges before the shoals were removed, 1539, 1540.

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**Limehouse.** Hardship if the Limehouse board, having already done what is necessary for the prevention of floods in their district, were to be again taxed for flood works elsewhere, *Law* 1035-1038—Remedies already adopted in Limehouse and other places down the river for preventing overflows, *Barlow* 1359. 1385-1390—Satisfactory action of the Limehouse Board in taking precautions for the prevention of floods in the district, 280.

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Further objection to the local authorities being still left, as under the Act of 1855, to provide the required remedies, instead of the matter being under the control of a central body, *Sir J. Bazalgette* 1624-1627.

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## M.

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**Maintenance and Repair of Works.** Obvious necessity of supervision in order to secure the proper maintenance and repair of the proposed inundation works, *Shaw* 1185 — Necessity of a constant supervision of the works, so as to secure their being properly maintained and, if necessary, in course of time increased, *Barlow* 1513-1516 — Power of the authorities under the Bill to require the wharfingers and owners to keep the walls and works in order and repair, *Sir J. Bazalgette* 1622, 1623.

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Power proposed to be taken by the Metropolitan Board to require the local authorities to execute the necessary works for protection against floods; else the Board can execute them and charge for them, *Sir J. Bazalgette* 115-118 — Examination in support of the increased powers proposed to be taken by the Board, *ib.* 688-720 — Question more especially whether under Clause 69 of the Metropolis Local Management Act of 1855, the Metropolitan Board has not already sufficient powers over the local authorities for the carrying out of the required works, without the necessity of the present Bill, *ib.* 708-720.

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Considerable period for which the Board has had under discussion the action to be taken in reference to the prevention of floods, *Roche* 1997-2000 — Summary of the chief provisions of the Bill before the Committee, and of the new powers asked for by the Metropolitan Board with regard to the prevention of floods, the apportionment of cost, &c., *ib.* 2021-2045.

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Further explanation in connection with the proposal that the Metropolitan Board shall, in certain cases, carry out the works, and shall assess the cost upon the owners or district boards interested, *Roche* 2970–2974—Examination showing the extensive powers of interference already possessed by the Board in regard to sewers generally in the metropolis; that is, in control of the vestries and district boards in the matter, *ib.* 2975–3003—Feeling of the representatives of some riverside districts that the works should be dealt with locally, as proposed by the Bill, *ib.* 3016, 3017.

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**Millbank.** Intended embankment between the Houses of Parliament and Chelsea; metropolitan character of this improvement, *Sir J. Bazalgette* 319–323, 327, 328—Protection to be afforded against overflows by the proposed Millbank Embankment, *ib.* 407–411.

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**Navigation of the River.** Great improvement in the navigation by the removal of old London Bridge, and of shoals and other obstructions to the flow and ebb of the tide, *Sir J. Bazalgette* 45–50; *Law* 813 *et seq.*—Necessity of the approval of the Thames Conservators, before any plans can be carried out affecting the navigation, *Sir J. Bazalgette* 123–125.

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**Nene River.** Increased volume of flood water in the River Nene, owing to the same causes which affect the Thames, *Abernethy* 1206—Failure on financial grounds of a scheme proposed by witness for dealing with part of the river, *ib.* 1277–1280.

**Newington.** Facility of ascertaining the amount of benefit to Newington parish, though not abutting on the river, *Roche* 2229–2232—Liability of Newington to pay, though not fronting the river, *ib.* 2318–2321.

**Newton's Draw-dock (Bankside).** Explanation in reference to the mode proposed for dealing with Newton's draw-dock, *Sir J. Bazalgette* 1902–1908.

## O.

**Old London Bridge.** *See London Bridge.*

**OWNERS (WHARFINGERS AND FRONTAGERS):**

Several instances of wharfingers willing to execute the required works, if their neighbours will do likewise, so as to make the works complete, *Sir J. Bazalgette* 93, 94—Doubt whether there is at present any legal obligation on a waterside proprietor to raise his frontage to the river, *ib.* 183–185.



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## OWNERS (WHARFINGERS AND FRONTAGERS)—continued.

Examination as to the grounds for witness' conclusion that the wharfingers or frontagers in Southwark should bear the cost of the required flood works, though such works may not be actually necessary for the profitable conduct of their business, and may rather benefit those behind them, *Sir J. Bazalgette* 342-365. 385-395—Opinion as to the fairness of the wharfinger bearing any loss that may accrue from the stoppage of business during the execution of the works, *ib.* 374-384.

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Continued liability of certain persons to repair by prescription and otherwise; facility to joint action between such persons and the district board, *Roche* 2028-2030—Statement to the effect that witness was well aware, when the Bill was being prepared, that the riparian owners were not compellable by law to provide inundation works unless they were liable by prescription, tenure, or otherwise, *ib.* 2397-2407.

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## P.

*Petitions.* List of petitions against the Bill, *Rep.* vi, vii—Petitions against proposed alterations in the Bill, *ib.* viii.

*Plans.* Contemplated deposit of plans with the Thames Conservancy, in the event of the Metropolitan Board proposing to interfere with the bed of the river, *Sir J. Bazalgette* 119-122—Explanation that plans are not submitted by the Board before intercepting sewage works are concerned, *ib.* 223, 224.

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*Pool, The.* Reduction of resistance to the free influx of the tide by the removal of a large number of colliers and other vessels from the Pool, *Law* 856-858.

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*Poplar.* Estimate of 6,700 *l.* as the cost of the required works in the Poplar district, *Sir J. Bazalgette* 1545.

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## Q.

*Queenhithe.* Information relative to a wall proposed at Queenhithe and Smith's Wharf for the prevention of overflows; limited obstruction thereby, *Sir J. Bazalgette* 1839 1847.

## R.

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*Rateable Value.* Information as to the rateable value of the principal parishes or district affected by the proposed scheme of works, *Roche* 2223-2236.

*Ravensbourne River.* Simple remedy for preventing very high tides running up the Ravensbourne and overflowing its banks, *Sir J. Bazalgette* 778, 779—Tide flap might be placed at the mouth of the river so as to prevent any tidal water running up *ib.* 778.

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*Richardson, Guildford Barber.* (Analysis of his Evidence.)—Experience of witness since 1862 as representative for Greenwich at the Metropolitan Board of Works; he has been a member of the Works and General Purposes Committee of the Board and of the Parliamentary Committee, 2538-2542.

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*Shoals (Dredging Operations).* Necessity of extensive dredging and removal of shoals subsequently to the removal of the old bridges; gradual increase in the rise of the tide in the river accordingly as the obstructions caused by shoals were removed, *Law* 826-833. 949.

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*Thames Conservancy.* Examination as to the jurisdiction vested in the Thames Conservators in respect of the soil and shares of the river under the Conservancy Act of 1857, *Sir J. Bazalgette* 105-108—Provision in the Conservancy Act as to one-third of the tolls for piers and jetties being handed over to the Crown, *ib.* 108-112—Representative character of the Thames Conservancy, a certain proportion of the members being elected by wharfingers and others, *ib.* 112-114.

Explanation that it is not proposed or intended by the Bill to limit in any way the right of the Conservators under the Act of 1857 to the bed, soil, and shores of the river, *Sir J. Bazalgette* 123-132—Similar necessity under the Bill, as under the Metropolitan Local Management Act, of obtaining the consent of the Thames Conservancy before constructing any work interfering with the navigation, *ib.* 743-748.

Contest some years ago between the Crown and the Conservancy, when an order was made in Chancery that no works should be executed upon the bed of the river without the approval of the Crown, *Law* 811—Compromise between the Crown and the Thames Conservancy by the Act of 1857, the former transferring to the latter its interests in the bed and soil of the river on certain conditions previously agreed upon, *ib.* 1059-1061—Statement upon the subject of the preservation of the rights of the Conservators under the Acts for the Victoria and Albert Embankments, *ib.* 1062-1070.

Statement as to its having been found impossible, within the time allowed, to supply the Conservancy Board with complete plans of the whole works proposed; facility given to the Board to inspect the plans in witness' office, *Sir J. Bazalgette* 1674-1679.

Examination to the effect that it is not intended by the Bill to interfere in any way with the position and rights of the Conservancy Board as regards the navigation of the river, *Roche* 2064-2080—Power under the Bill for acquiring any small space of the bed or shore of the river that may be required for an inundation wall, *ib.* 2073-2080—Willingness of the Metropolitan Board to give the fullest weight to any suggestion by the Conservancy Board in the interests of the latter, *ib.* 2081, 2082—Identical character

*Thames Conservancy—continued.*

character of certain clauses in the Bill, and in the Main Drainage Act, as regards interference with the Thames Conservancy, *Roche* 2507-2510.

Opinion that the Metropolitan Board should be (and probably soon will be) represented at the Conservancy Board, *Richardson* 2639-2646—Explanation that it is not proposed or sought by the Bill in any way to limit the rights of the Conservancy; that is, on the supposition that these rights are confined to the navigation of the river, *ib.* 2647-2660. 2848. 2850.—Willingness of the Metropolitan Board to give full consideration to any clauses that may be submitted by the Conservancy Board, *ib.* 2660-2662. 2849.

**THAMES EMBANKMENT :**

1. *Evidence to the Effect that the Embankment has not been instrumental in raising the Level of the River at High Water, or in causing Overflows on the South Side.*
2. *Area subtracted from the River by the Embankment, as compared with the Amount of Sewage diverted.*
3. *Formation of the Embankment, as a general Metropolitan Improvement, irrespectively of Floods.*
4. *Inexpediency of further Embankment in reference merely to Floods.*
5. *Benefit to Wharfingers by the Embankment.*
6. *Cost of the Embankment, as charged upon the Coal and Wine Dues.*

1. *Evidence to the Effect that the Embankment has not been instrumental in raising the Level of the River at High Water, or in causing Overflows on the South Side :*

Grounds for the conclusion that the embankments have not acted as a new obstruction to the tidal range, nor been instrumental in causing the floods on the south side; reference hereon to the sectional area at different points, *Sir J. Bazalgette* 40-50. 58-63—Slight increase in the velocity of the current owing to the embankment; reduced area on the other hand through which the current passes, *ib.* 137-143. 150-152—Decrease in the volume of the tide when the embankments are in operation; this being a compensation for the increase in the velocity, *ib.* 248-255—Inappreciable effect of the Thames Embankment in raising the height of the tide in parts of the river above the embankment, *ib.* 767-772.

Result of careful calculations by witness that the Thames Embankment has not contributed to the overflow of the Thames; belief that the effect of the scheme on the whole has been to slightly diminish the height at high water, *Law* 859-871—Statement as to the embankment not deflecting the current to the opposite side of the river, *ib.* 861—Increased velocity of the current in consequence of the embankment; counteracting effect on the other hand of the reduced area as regards the quantity of water going up the river, *ib.* 862—Occurrence doubtless of the highest tides since the construction of the embankment, but not in consequence thereof, *ib.* 940-949.

Grounds for the conclusion that the embankment by narrowing the river in some places and increasing the velocity, does not cause a larger quantity of water to go up the river at the same time; that is, on account of the diminution of the area, *Law* 1101-1114.

Decided opinion that the very high tides in the river in recent years have not been due to the Thames Embankment, *Abernethy* 1197-1203. 1258—Increased velocity of the current as an effect of the embankment; reduction on the other hand of the sectional area, *ib.* 1202—Inaccuracy of the assumption that the embankment on the north side causes the river to overflow on the south side, *ib.* 1247. 1332-1342.

Conclusion as to the increased height of the level of the river not being confined to those sections of the river opposite or above the embankment, but extending to places several miles below any possible influence of the latter, *Barlow* 1359-1365—Diminished area of the river through the embankment, this fully compensating for the increase caused in the velocity of the current, *ib.* 1366. 1367-1375.

Examination to the effect that the embankment has not operated in causing higher tides or increased overflows above London Bridge, but that owing to the removal of shoals and other obstructions, tides have been higher in recent years than formerly, *Barlow* 1367-1379. 1395 *et seq.*—Inaccuracy of the assumption that the level of the river has been raised through the water being confined by the embankments in a narrower channel, *ib.* 1367. 1418-1435.

Examination in further support of the conclusion that a narrowing of the channel by means of the embankment has not had the effect of raising the level of the river, or causing floods and overflows, *Barlow* 1466-1505—The high tides in recent years were not, in fact, a consequence of the Thames Embankment, *Law* 1527—Dissent from the  
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*THAMES EMBANKMENT*—continued.1. *Evidence to the Effect that the Embankment, &c.*—continued.

view that as a result of the embankment on the north side, an increased quantity of water passes along and over the south side, *Richardson* 2921-2932.

2. *Area subtracted from the River by the Embankment, as compared with the Amount of Sewage diverted:*

Displacement of about 587,000 tons of water by the sites and area used and by the Thames Embankment, including the Victoria, Albert, and Chelsea Embankments; still larger quantity of sewage diverted from the river by the intercepting sewers, *Sir J. Bazalgette* 30-39—Inappreciable effect upon the height or volume of water by the area of about fifty acres excluded from the river by the embankment, *ib.* 146.

Calculation that whilst the area taken up by the embankments excludes 58 of water daily from the river, the embankment and intercepting sewers divert 607,140 tons of sewage, &c., *Law* 860. 865-867—Further statement of inappreciable effect upon the level of the river by the exclusion of water from the river for the embankment, *ib.* 924-933. 1151-1158. 1190-1193.

Inappreciable effect upon the amount of water in the upper reaches by the exclusion of an area of about fifty acres for the embankment; this is more than counterbalanced by the quantity of sewage diverted from the river, *Abernethy* 1219-1227. 1316—Larger quantity of sewage diverted from the river than is represented by the area excluded from the river by the embankment, *Barlow* 1358. 1445-1447.

3. *Formation of the Embankment as a general Metropolitan Improvement for the Prevention of Floods:*

Explanation as to the embankments of the Thames having had reference to the main drainage scheme, and to improved thoroughfares, though protection from floods has also resulted, *Roche* 2447-2453.

Statement that the embankment was formed as a general metropolitan improvement, there being no analogy with reference to incidence of charge between the embankment and the proposed inundation works, *Richardson* 2621—Reference to the arches and draw docks in parts of the embankment as showing that the latter was not intended to act for the prevention of floods, *ib.* 2621.

Important and leading thoroughfares supplied by the Victoria, Chelsea, and Albert Embankments, so that as great street improvements they are properly charged to the ratepayers generally, *Roche* 2950-2956. 2965, 2966—Value also of the embankment for main drainage purposes, thus further placing them in the class of metropolitan improvements, *ib.* 2957-2961. 2967—Incidental effect of the embankments in the prevention of floods; they would never have been made for that object only, *ib.* 2962-2964.

4. *Inexpediency of further Embankment in reference merely to Floods:*

Opinion that there is no necessity at present for any further or larger embankment of the Thames, *Sir J. Bazalgette* 195, 196—Entire inaccuracy of an assurance reported in favour of a large extension of the existing embankments as a means of preventing overflows, *ib.* 241-247—Effectual prevention of floods doubtless secured by an embankment, as in Lambeth the great cost involved being, however, unnecessary, as much cheaper means will answer the desired end, *ib.* 421-423.

Decided objection to a continuous embankment as altogether unnecessary and objectionable in view, and as being extremely costly, *Law* 884, 885—Consideration of the Metropolitan Board to the question of an embankment scheme, which was as altogether unnecessary, *Roche* 2344-2346.

5. *Benefit to Wharfmasters by the Embankment:*

Examination to the effect that if any wharfmasters were bound to do protective works as a consequence of the Thames Embankment, though witnesses does not admit that such, they would not necessarily have a good claim to compensation, as the benefit from the embankment should be considered, *Law* 901-916.

6. *Cost of the Embankment, as charged upon the Coal and Wine Dues.*

Total of about 2,600,000 l. as the cost of the Victoria, Albert, and Chelsea Embankments, *Sir J. Bazalgette* 341—Explanation that the embankment and main drainage are charged entirely on the coal and wine dues, *Richardson* 2623-2625. 2933-

See also *Albert Embankment.* *Barges.* *Main Drainage.*  
*Navigation of the River.* *Southwark.*

*Thames Valley Drainage.* See *Land Floods.*

*Thwaites, Sir John.* Views of Sir John Thwaites in 1859 as to the expediency of all great metropolitan improvements being treated otherwise than as local matters, *Roche* 2454--2459.

*Tide-gates.* Suggested use of tide-gates in the case of wide openings, as at bont-building slips, *Law* 1142-1145.

#### TIDES :

1. *Generally as to the Causes of very High Tides in the Thames; Denial that the Thames Embankment is one Cause.*
2. *Particular Instances of extraordinarily High Tides.*
3. *Diagrams, &c., submitted by Mr. Law.*

1. *Generally as to the Causes of very High Tides in the Thames; Denial that the Thames Embankment is one Cause :*

Facility of calculating the precise height of each tide, in the absence of disturbing causes, such as the state of the wind, and the amount of rainfall and flood in the upper parts of the river, *Sir J. Bazalgette* 6-9—High tides caused by gales from the north-west, especially when followed by a south-west wind, and when the river is already in flood, *ib.* 8, 9.

Concurrence in the view that the very high tides in the Thames in recent years have not been caused or promoted by the Eebankment of the river; detailed arguments in support of this conclusion, *Sir J. Bazalgette* 40-63. 137-143. 150-152. 767-772; *Law* 859 *et seq.*; *Abernethy* 1197-1203; *Barlow* 1359 *et seq.*

Increased rise and fall of the spring tides within the last few years, but not in consequence of the Thames Embankment; increasing volume of water coming up the river through the removal of artificial obstructions, *Sir J. Bazalgette* 40-70—Considerable increase in the height of the river at high water, and in the fall at low water, in the period from 1823 to 1845, before the creation of the Metropolitan Board, *ib.* 51-57.

Inaccuracy of the assumption that a definite quantity of water is passed up the Thames by each tide, irrespectively of the varying effects of winds and of obstructions in the river, *Law* 841-850—Production of the tides in the Thames by two distinct waves, one from the North Sea and one from the Atlantic and the English Channel, the latter not arriving at the mouth of the Thames under ordinary circumstances till nearly three hours after the North Sea wave, *ib.* 841—Explanations in detail, aided by chart and drawings, as to the effect produced by gales from the south-west in accelerating the arrival of the English Channel wave at the mouth of the Thames, and thereby increasing the mountain of the tide up the river, *ib.* 841-846.

Considerable reduction in the resistance offered in late years to the momentum of the tide by friction from the bed of the river, and by obstacles at the bridges, *Law* 846-850—Gradual reduction in the resistance offered by the bed of the river, in consequence of the gradual deepening of the bed, *ib.* 850. 858—Statement showing that the crest of the wave at high water expends itself in running up the Thames from Sheerness at the rate of thirty miles an hour, *ib.* 851-855—Reference to a diagram on the foregoing subject showing the great variation in the height of the water at different parts of the river at the same time; instance of ten and a half feet lower level at St. Katharine's Dock than at Sheerness, *ib.* 851.

Further statement that high tides are attributable to a concurrence of causes, the main cause being a rapid change from a south-westerly to a north-westerly gale, *Law* 872-874—Further statement as to the removal of the bridges, and other obstructions to the flow of the tide being the real cause of the higher tides and floods, and not the Thames Embankment, *ib.* 1012-1016.

Examination with further reference to the heaping up of the tide at high water, not only at Old London Bridge but at Southwark, Blackfriars, and Westminster Bridges, *Law* 1072-1106—Occurrence of extraordinarily high tides in recent years at Sheerness, Harwich, and other places, as well as in the Thames, since the Embankment was made, *ib.* 1159-1161—Entire fallacy of the notion that the Embankment could have anything to do with the height of the tide at Sheerness, *ib.* 1162, 1163.

Statement as to the river not being relieved of any quantity of tidal water by overflows into Lambeth, or other low-lying districts, *Law* 1174-1179—Necessity of extra precautions only two or three days in the month after every new and full moon, *ib.* 1187—Inappreciable extent to which a general raising of the banks and wharves would increase the height or level of the river at high tides within the banks, or above the point where the banks end, *ib.* 1115-1126.\* 1180-1183.

Effect of the removal of shoals, and of old London Bridge and other bridges which formerly obstructed the water way in raising the level of the river at high water, and in depressing the low-water level, *Abernethy* 1196—Increased high water level in tidal rivers generally by the removal of obstructions to the free flow of the tide, *ib.* 1196. 1206.

*TIDES*—continued.1. *Generally as to the Causes of very High Tides in the Thames, &c.*—continued.

1210-1212—Explanation that the height of the tidal wave up the river is not increased by any raising of the banks below, *Abernethy* 1305-1310.

Increased impetus to the tidal flow up the river by the removal of old London Bridge and other bridges, as well as of shoals; increased height at high water since these obstructions have been removed, *Barlow* 1352, 1353, 1365—Greater frequency of high tides in recent years, though there were many high tides before the Embankment was made, *ib.* 1517-1519—Belief that the extraordinarily high tides in the years 1874-77 have occurred from exceptional circumstances with regard to wind and rain, *ib.* 1523.

Important effect of the removal of the old bridges at Westminster and Blackfriars, together with the displacement of shoals and the deepening of the river by extensive dredging operations in causing the extraordinarily high tides experienced in the last four years, *Law* 1524-1531—Inappreciable difference in the height of the tide in different parts of the river, *Sir J. Bazalgette* 1614, 1615—Evidence as to the occasional recurrence of very high tides in the Channel, and consequently in the Thames, *Richardson* 2914-2920.

2. *Particular Instances of extraordinarily High Tides :*

Instances of very high tides and floods from the year 1099 to the present time; probability of many other high tides in former years, of which there is no record, *Sir J. Bazalgette* 10-14.

Extraordinary concurrence of circumstances which caused the high tide of 2nd January 1877, there having been a flood in the river, a south-westerly gale up the Channel, a north-westerly gale from the north, and an easterly wind blowing up the Thames, *Law* 841—Almost identical conditions, as in the foregoing case, which led to the high tide of 15th November 1875, the highest on record, *ib.*

Further reference to the exceptional character of the flood of 15th November 1875; varying amount of overflow at different points, *Law* 886-891—Further reference to the extraordinary concurrence of circumstances which led to the high tide of 2nd January 1877; *ib.* 1161.

3. *Diagrams, &c., submitted by Mr. Law :*

Explanation in connection with diagram showing every high tide which has occurred since the removal of old London Bridge in 1833, *Law* 873—Reference also to a diagram showing the tides for about a month in the early part of 1836, the height predicted for each tide, &c., *ib.* 874.

Diagram showing the rise and fall of the tide at London Bridge on 29th June 1821; *App.* 203.

Observations by Mr. Law on the relative heights of the tide above and below London Bridge on 29th July 1821; *App.* 203.

Diagram submitted by Mr. Law showing the effect of the wind in increasing the height of the tide at the mouth of the Thames, *App.* 203.

Longitudinal section of the Thames from Teddington to Shadwell, showing the successive levels of the high and low-water lines and the lowering of the bed, *App.* 203.

Diagram showing the contemporaneous levels of the Thames at Sheerness, St. Katharine's Docks, and Chelsea, on the 17th March 1843, *App.* 203.

Diagram showing the influence of the weather and of heavy rainfall on the height of the tide at the mouth of the Thames, *App.* 203.

Diagram showing the high tides in the river since the year 1833; *App.* 203.

Diagram showing the influence of the wind upon the height of the tide at the London Docks, *App.* 203.

See also *Drainage (Thames Valley).*    *Land Floods.*    *London Bridge.*    *Shoals.*  
*Thames Embankment.*    *Works.*

*Tooley Street.* Examination upon the question whether works for the prevention of overflows in Tooley-street and Thames-street should not be treated as a metropolitan improvement, *Richardson* 2785-2812. 2882-2890.

*Trade.* Doubt as to any greater obstruction to trade by the works remaining to be carried out than by those already completed voluntarily by the parties, *Sir J. Bazalgette* 800, 801—Sufficiency of the class of works contemplated by the Bill, whilst they can be carried out without any serious interference with the business of the wharves, *Law* 878-885.

See also *Compensation.*

*Tributaries*



## Report, 1877—continued.

**Tributaries of the Thames.** Liability of the Wandle and the Ravensbourne to be flooded and also the Quaggy in some parts where not closed; entirely distinct treatment required for these rivers as compared with the Thames, *Sir J. Bazalgette* 529-536. 540-542. 5—Sufficiency of the proposed works as regards the Thames but not as regards certain small rivers and creeks running into the Thames and liable to overflow, *ib.* 547-550.

Object of the Bill to deal only with the Thames, irrespectively of its tributaries, *L.* 977, 978. 999-1003—Question whether the Wandle and other tributary streams should not be placed under supervision, *Abernethy* 1268-1271—Means of excluding high tides from the Wandle and other tributaries by placing tide-gates at their entrance in the Thames, *ib.* 1301-1304.

See also *Ravensbourne River.* *Wandle River.*

**Tyne, The.** Material increase of the high water level at Newcastle owing to the removal of shoals from the bed of the Tyne, *Abernethy* 1212—Expensive works carried out by wharfingers on the Tyne in consequence of the deepening of the bed of the river, *ib.* 1259. 1299—Special powers of the Tyne Commissioners for dealing with the tidal portion of the river, whilst the wharfingers have found it necessary to repair their wharves at their own expense, *ib.* 1325-1331. 1345. 1346.

## V.

**Value of Land.** Large increase of value to be given to some low-lying lands by the exclusion of floods, *Richardson* 2903, 2904.

**Vestries and District Boards.** See *Local Authorities.*

**Victoria Embankment.** Circumstance of the Victoria Embankment having been raised six inches as a precautionary measure; that is on account of the increased height of tide since its construction, *Sir J. Bazalgette* 256-262.

Question considered whether the Victoria Embankment (charged on the whole metropolitan area) has not specially benefited Westminster as regards protection against floods, *Roc* 2134-2143.

See also *Thames Embankment.*

**Voluntary Action.** Facility in carrying out the necessary works if the wharfowners and district boards would undertake them without being compelled by Act to do so, *Sir J. Bazalgette* 673-675. 707.

## W.

**Wandle River.** Explanation that it is not proposed under the Bill to deal with the Wandle by independent arrangement for preventing Wandle overflows, *Sir J. Bazalgette* 188-190—Short distance for which the Wandle near the Thames is tidal; witness has made a rough estimate of the works required in this district, *ib.* 622-631.

Necessity, as regards the Wandle, either of raising the banks or excluding the tide by general power under the Bill for applying precautions in this case as by means of flood gates, *Sir J. Bazalgette* 658-672—Statement that the proposed works would not cause any overflow of the Wandle; alternative means of preventing floods in this river from high tides in the Thames, *ib.* 774-777.

Examination to the effect that works on the Wandle and other tributaries are not proposed by the Bill, but that protection of the Wandle from high tides may be secured by means of tidal gates at the mouth of the river, *Law* 979-1003.

Modifications proposed by witness in the plan first contemplated for dealing with the Wandle; estimate of 3,000 *l.* for the works now suggested, *Sir J. Bazalgette* 1795-1800—Object of the works on the Wandle to prevent flooding from the Thames, floods from the Wandle itself not being dealt with, *ib.* 1807. 1812-1814.

**Wandsworth.** Illustration in the case of Wandsworth district of the varied character of the works required, *Sir J. Bazalgette* 1545—Estimate of 9,700 *l.* as the cost of works to be erected by the Wandsworth district board, *ib.*—Circumstance of the estimated cost in Wandsworth district being more than half that for the whole north side of the river, *ib.* 1792-1794—Proposed construction of a new parapet wall five feet high in front of the brewery in Wandsworth, *ib.* 1808-1811.

**Westminster.** Protection of Westminster against floods by means of the Victoria Embankment, *Sir J. Bazalgette* 153, 154.

**Westminster Bridge.** Considerable reduction in the sectional area of the river at old Westminster Bridge; increase of the area to 18,334 feet upon the entire removal of the old bridge, *Law* 834-836—Effect produced by the obstructions at old Westminster and Blackfriars

*Westminster Bridge—continued.*

Blackfriars bridges in adding to the effect of old London Bridge in retarding the flow and ebb of the tide, *Law* 838. 849.

Explanation that it was not till the end of 1861 that the obstruction caused by old Westminster Bridge was entirely removed, though the new bridge was partially opened in March 1860, *Law* 1837, 1838.

*Woolwich.* Estimate of 2,200 l. as the cost to be incurred for new works in Woolwich parish, *Sir J. Bazalgette* 1545.

*WORKS (PREVENTION OF FLOODS):*

Official report made by witness on the subject of the prevention of floods in the Thames; suggestions therein as to the precautions to be taken by owners, and as to the action of district boards and vestries in the matter, *Sir J. Bazalgette* 67-69—Circular letter sent by witness to the wharfingers and riverside owners on 10th January 1877, submitting that the frontage to the river should in each case be raised so many feet, *ib.* 70-74—Information as to the extent and character of the works carried out in consequence of the Board's letter of 10th January; nearly one-half of the required works have not been done, *ib.* 75-94.

Statement to the effect that the Board in taking power to execute works in default, does not contemplate any extensive works, *Sir J. Bazalgette* 156-161. 174—Difficulty in estimating the total amount of work to be done, though witness could tell how much should be executed by each individual, *ib.* 162-167—Expediency of the Metropolitan Board being vested with a discretion as to the ordering of works, it not being intended to require other than small local works, *ib.* 199-201.

Further statement as to the small and isolated character of the works necessary for the prevention of overflows, *Sir J. Bazalgette* 227-230—Proposal that the wharves, &c. be raised to a level of five feet above Trinity high-water mark, *ib.* 235. 383—Dissent from the view that any arbitrary power is sought by the Bill whereby the Board might carry out an exceedingly costly scheme without submitting plans, &c., *ib.* 339-341—Doubt as to the legal effect of the interpretation of the words "bank" and "works" in the Bill; that is with respect to the power of the Metropolitan Board to execute embankment works, *ib.* 412-416.

Inability of witness at present to describe the actual works required, or to distinguish between those which are more or less costly, *Sir J. Bazalgette* 558-564—Usefulness of embankment by separate proprietors, even though there may not be a continuity, *ib.* 612—Expected sufficiency of the proposed works for many years to come, though in course of time still higher tides may occur requiring some additional works, *ib.* 653-655—Similar level to which it is proposed that all the walls, &c. shall be raised, *ib.* 656, 657.

Great improbability of extensive works being carried out by the Board far in excess of what is now contemplated or is necessary, *Law* 966-976—Sufficiency of the machinery for ensuring the construction of the required works, though the actual works are not specified, *ib.* 1039-1045. 1048-1050—Complete and efficient character of the proposed works, though it is not intended that they shall be carried out directly by the Metropolitan Board, or at the cost of the Board, *ib.* 1127-1129.

Reference to the works contemplated by the Bill as not being in the nature of continuous or training walls, *Barlow* 1460-1465.

Further admission as to there being nothing in the Bill to limit the discretion of the Metropolitan Board as to the extent of the works, *Sir J. Bazalgette* 1551-1554. 1635-1638—Contemplated modification of the works proposed by witness accordingly as the Board may find necessary on further investigation, *ib.* 1635-1638. 1804-1806—Patchwork appearance of the proposed works as compared with a uniform embankment, *ib.* 1680, 1681. 1697-1699.

Belief that the works recommended by witness combine economy and efficiency; if acting for the district boards or other local authorities he would have proposed precisely the same works, *Sir J. Bazalgette* 1957-1968.

Reason for the Board not binding themselves to carry out the works in any particular way, though they may be trusted not to substitute any large or costly scheme for that proposed by their engineer, *Roche* 2339-2348—Expediency of Sir Joseph Bazalgette rather than witness being asked to explain why certain wharves and premises are not included in the report and estimate submitted by the former to the Board on 26th March 1877, *ib.* 2491-2504—Expediency of full power in the Board to modify the proposed works on farther investigation, *Richardson* 2891-2896.

See also *Compulsory Powers.* *Cost.* *Fulham.* *Greenwich.* *Local Authorities.* *Owners.* *Plans.* *Slides.* *Tide-gates.* *Tides.* *Tributaries of the Thames.* *Wandle River.*





I N D E X  
TO THE  
R E P O R T  
FROM THE  
S E L E C T C O M M I T T E E  
ON  
THAMES RIVER  
(PREVENTION OF FLOODS, &c.)

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*Ordered, by The House of Commons, to be Printed  
21 June 1877.*

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*Under*

# R E P O R T

FROM THE

SELECT COMMITTEE

ON

TURNPIKE ACTS CONTINUANCE;

WITH THE

PROCEEDINGS OF THE COMMITTEE.

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*Ordered, by The House of Commons, to be Printed,  
15 May 1877.*

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*Monday, 19th February 1877.*

*Ordered, THAT a Select Committee be appointed to inquire into the Sixth "The Annual Turnpike Acts Continuance Act, 1876."*

Lord George Cavendish.  
Lord Henry Thynne.  
Mr. Beach.  
Mr. Wentworth Beaumont.  
Sir Robert Anstruther.  
Mr. Wilbraham Egerton.

Sir Harcourt Johnst  
Mr. Clare Read.  
Mr. Spencer Stanho  
Mr. George Clive.  
Mr. Salt.

*Ordered, THAT the Committee have power to send for Persons, Papers, and*

*Ordered, THAT Three be the Quorum of the Committee.*

*Ordered, THAT it be an Instruction to the Committee to inquire and report to the House under what conditions, with reference to the rate of interest, expenses of management, maintenance of road, payment of debt, and term of years, or of other arrangements, the Acts of the Trusts mentioned should be continued.*

*Ordered, THAT all Petitions referring to the continuance or discontinuance of Turnpike Trusts be referred to the Committee.*

The following presented PETITIONS referred to the Committee under the Order of the 19th February were—

Feb. 27	For inquiry into the Doncaster and Selby Trust. From Whitley, West Haddlesey, Kellington, Bentley, Aske, Eggborough, Norton, Beal, Brayton, Chapel Haddlesey.
March 1	Against continuance of Honiton Trust. From Honiton.
" 2	Against continuance of Sutton and Reigate Trust. From Reigate.
" 2	Against continuance of Goudhurst Trust. From Goudhurst.
" 5	Against continuance of Bridport (First District) Local Act. From Bridport (three Petitions) and Charmouth.
" 5	Against continuance of Dover and Sandgate Trust. From Dover and from Folkestone and Sandgate.
" 5	Against continuance of Reigate Local Act. From Redhill.
" 6	Against continuance of Honiton Trust. From Cullompton.
" 8	Against continuance of Ashford and Ham Street Local Acts. From Orlestone.
" 8	Against continuance of Sherborne Local Act. From Yeovil.
" 8	For continuance of the Stokenchurch and New Woodstock Trust. From the Local Board of Oxford.
" 9	Against continuance of Lyme Regis Act. From Newton and other places, Lyme Regis, and Colyford.
" 12	Against continuance of the Bethersden Act. From Ashford.
" 12	Against continuance of Minchinhampton, Tetbury, and Bisley Trusts. From Brimscombe.
" 12	Against continuance of the Gosport, Bishop's Waltham, Wickham and Fareham Pond Local Act. From Fareham.

## PETITIONS referred to the Committee under Order of the 19th February.

March 12	Against continuance of the Titchfield and Cosham Local Act. From Titchfield.
„ 13	Against continuance of the Wigan and Preston, and North of Ja From Leyland Hundred Highway Board.
„ 14	Against continuance of the Canterbury and Barham Local Act. From W. E. Rigden and others.
„ 12	Against continuance of the Dover and Sandgate Act. From Dover.
„ 14	Against continuance of Canterbury and Sandwich Act. From W. E. Rigden and Others.
„ 15	Against continuance of the Dover, Folkestone, and Sandgate A From Hythe, and from Folkestone.
„ 15	Against continuance of Malling and Strood Act. From Snodland.
„ 15	In favour of continuance of the Dover and Sandgate Act. From Frederick Tolputt and Others.
„ 16	Against continuance of Botley and Newland Trust. From Oxford.
„ 19	Against continuance of Alford and Boston Trust. From the Corporation of Boston, and W. Horey and Other
„ 21	Against continuance of Crewkerne Local Act, 1825. From Crewkerne ; John Strond and Others.
„ 21	Against continuance of Stroud and Chalford Act, 1855. From Joseph Wood and Others.
„ 21	Against continuance of Reigate Local Act. From Kingswood and Carshalton.
„ 21	Against continuance of Lightpill and Birdlip Act, 1855. From Joseph Wood and Others.
„ 22	For continuance of Local Act, 6 Geo. 4, c. 159. From Crewkerne.
„ 23	Against continuance of Reigate Trust Act, 1815. From Horley.
„ 26	Against continuance of Brighton, Shoreham, and Lancing Trust From Brighton.
„ 26	Against continuance of Reigate Trust. From Reigate ; Sutton.
„ 26	Against continuance of Mayfield and Wadhurst Trust. From Tunbridge Wells.
„ 26	Against continuance of Tunbridge Wells and Maresfield Trust. From Tunbridge Wells.
„ 26	In favour of continuance of Brighton, Shoreham, and Lancing T From Hugh Gorringe and Others.
„ 27	Against continuance of Hanley and Bucknall Trust. From Hanley.
April 18	For continuance of Nottingham and Newhaven Trust (so far as : the 3rd District). From Matlock ; Matlock Bath ; Darley ; Over Haddon ; Rousley ; Haddon.
„ 30	Against continuance of the Brighton, Shoreham, and Lancing L From Brighton.

## R E P O R T.

THE SELECT COMMITTEE appointed to inquire into the SIXTH SCHEDULE of "The ANNUAL TURNPIKE ACTS CONTINUANCE ACT, 1876," and who were instructed to inquire and report to the House under what conditions, with reference to the Rate of Interest, Expenses of Management, Maintenance of Roads, Payment of Debt, and Term of Years, or other special arrangements, the Acts of the Trusts mentioned should be continued; ———HAVE considered the matters to them referred, and have agreed to the following REPORT:—

1. YOUR Committee must repeat their conviction that unless some law is speedily enacted for the better management of highways, great injustice will be done to many parishes in consequence of the liability thrown on them of repairing roads, which were constructed for the purposes of through traffic. Many roads will undoubtedly fall out of repair, and through want of timely legislation much expense, which might have been avoided, will eventually be incurred in restoring the condition of these roads.

2. In pursuing their investigations into the affairs of the Trusts before them, your Committee found that in more than one case the trustees had set aside the conditions on which they had obtained a renewal of their Trust.

3. At their first meeting your Committee passed the following Resolution with reference to certain Trusts whose Acts have not yet expired: "That the Committee having been informed that a large number of Trusts are still in existence whose terms will not expire for some years, are of opinion that such as are insolvent, and such as are not fulfilling the conditions on which their Acts were obtained, should be scheduled in the Continuance Act of 1877, for consideration in 1878." They now recommend that those Trusts which are virtually out of debt, or are practically insolvent, should be scheduled in the Continuance Act of the present year for consideration in the year 1878; and that the remaining Trusts referred to in the above Resolution should be dealt with in a like manner at a future period.

4. Your Committee are of opinion that the following Trusts should be allowed to expire on the 1st of November next:—

Oakerthorpe and Ashborne.

Honiton.

Bridport, First District.

Lyme Regis.

Lyme Regis, Crewkerne Branch.

Sherborne.

Lightpill and Birdlip.

Minchinhampton, Tetbury, and Bisley.

Stroud, Cainscross, and Minchinhampton, Lower Division.

Stroud, Cainscross, and Minchinhampton, Upper Division.

Stroud and Chalford.

Stockbridge and Basingstoke.

Leominster and Ledbury.

Presteigne.

Canterbury and Sandwich.

Dover to Sandgate.

Goudhurst.

Wadhurst and West Farleigh.

Bolton and Nightingales.

Wigan and Preston, North of Yarrow.

Nottingham and Mansfield.

Nottingham and Newhaven, First District.



Charlbury Roads.  
 Minehead Roads.  
 Cowfold and Henfield, Old.  
 Mayfield and Wadhurst.  
 Tunbridge Wells and Maresfield.  
 Stourbridge, United.  
 Doncaster and Selby.  
 Holme Lane End and Heckmondwike.  
 Holmfirth District.  
 Keighley and Kendal, Yorkshire District.

5. That the Nottingham (Third District) Trust should be continued until 1st November 1878.

6. That the following Trusts should be continued until 1st November 1878, and no longer :—

Spilsby, Burton's Corner District.  
 Brighton, Shoreham, and Lancing.

7. That the Mold and Broughton Trust should be continued until 1st November 1879, and no longer.

8. That the Southampton (South District) Trust should be continued until 1st November 1880.

9. That the following Trusts should be continued until 1st November 1880, and no longer :—

Helston.  
 Wolverhampton, Old.

10. That the Wakefield and Austerlands Trust should be continued until 1st November 1882, and no longer.

11. Your Committee are of opinion that, with respect to the Trusts named after this paragraph, the arrangements specified in each case should be made for reducing the expenses from and after the 1st of November 1877, in regard to the salaries, interest, and road repairs, and for extinguishing all arrears of interest up to the 31st of December 1876.

12. That the Cavendish Bridge and Hulland Ward Trust should be continued until 1st November 1879, and no longer ; and that no interest on the debt should be payable.

13. That the Owler Bar Trust should be continued until 1st November 1880, and no longer ; and that the toll for every horse or other beast drawing any waggon, wain, cart, or other such-like carriage, or any taxable conveyance with not more than two wheels, should be reduced to 3 *d*.

14. That the Gosport, Bishop's Waltham, Wickham, and Chawton Trust should be continued until 1st November 1878, and no longer ; and that no interest on the debt should be payable.

15. That the Titchfield and Cosham Trust should be continued until 1st November 1878, and no longer ; and that no interest on the debt should be payable.

16. That the Ashford and Ham-street Trust should be continued until 1st November 1879, and no longer ; and that no interest on the debt should be payable.

17. That the Bethersden Trust should be continued until 1st November 1880, and no longer ; that the parish aid should not exceed 70 *l*. per annum ; and that no interest on the debt should be payable.

18. That the Canterbury and Barham Trust should be continued until 1st November 1878, and no longer ; and that no interest on the debt should be payable.

19. That the Malling and Strood Trust should be continued until 1st November 1878, and no longer ; that no interest on the debt should be payable ; and that the arrears of interest on the debt should be extinguished.

20. That

20. That the Louth Trust should be continued until 1st November 1878, and no longer; that no money should be expended out of the tolls on the repair of the roads; and that no interest on the debt should be payable.

21. That the Spilsby Trust should be continued until 1st November 1878, and no longer; that no money should be expended out of the tolls on the repair of the roads; and that no interest on the debt should be payable.

22. That the Elsdon and Reedwater Trust should be continued until 1st November 1880; and that no interest on the debt should be payable.

23. That the Mansfield and Tibshelf Trust should be continued until 1st November 1880, and no longer; and that no interest on the debt should be payable.

24. That the Nottingham and Loughborough Trust should be continued until 1st November 1880, and no longer; that the amount expended out of the tolls on the repair of the roads should not be less than 200 *l.* per annum; and that no interest on the debt should be payable.

25. That the Botley and Newland Trust should be continued until 1st November 1880 and no longer; that the amount expended out of the tolls on the repair of the roads should not be less than 550 *l.* per annum; that no interest on the debt should be payable; and that the Botley toll-gate should be removed beyond Elm's Farm.

26. That the Stokenchurch and Woodstock Trust should be continued until 1st November 1878, and no longer; that no money should be expended out of the tolls on the repair of the roads; and that no interest on the debt should be payable.

27. That the Stokenchurch and Woodstock, Islip Branch Trust, should be continued until 1st November 1878, and no longer; that no money should be expended out of the tolls on the repair of the roads; and that no interest on the debt should be payable.

28. That the Bishop's Castle (First District) Trust should be continued until 1st May 1878, and no longer; that no money should be expended out of the tolls on the repair of the roads; and that no interest on the debt should be payable.

29. That the Minsterley and Churchstoke Trust should be continued until 1st November 1879, and no longer; and that the amount expended out of the tolls on the repair of the roads should not be less than 250 *l.* per annum.

30. That the Crewkerne Trust should be continued until 1st November 1879, and no longer; that the amount expended out of the tolls on the repair of the roads should not be less than 500 *l.* per annum, and that no interest on the debt should be payable.

31. That the Burton-on-Trent and Abbot's Bromley Trust should be continued until 1st November 1882, and no longer; and that no interest on the debt should be payable.

32. That the Cannock and Penkridge Trust should be continued until 1st November 1880, and no longer; and that the amount expended out of the tolls on the repair of the roads should not be less than 100 *l.* per annum.

33. That the Handsworth and Perry Barr, United, Trust should be continued until 1st November 1879, and no longer; and that the amount expended out of the tolls on the repair of the roads should not be less than 500 *l.* per annum.

34. That the Hanley and Bucknall Trust should be continued until 1st May 1878, and no longer; that no money should be expended out of the tolls on the repair of the roads; and that no interest on the debt should be payable.

35. That the Rugeley and Stone, and Branches, Trust should be continued until 1st November 1882, and no longer; and that no interest on the debt should be payable.

36. That the Stone, Lane End, and Trentham Trust should be continued until 1st November 1879, and no longer; that the amount expended out of the tolls on the repair of the roads should not be less than 350 *l.* per annum; and that no interest on the debt should be payable.

37. That the Uttoxeter and Stoke, and Millwich and Sandon Trust should be continued until 1st November 1880, and no longer; that the amount expended out of the tolls on the repair of the roads should not be less than 70 *l.* per annum; and that no interest on the debt should be payable.

38. That the Reigate Trust should be continued until 1st November 1881, and no longer; that the amount expended out of the tolls on the repair of the roads should not be less than 800 *l.* per annum; and that no interest on the debt should be payable.

39. That the Beverley and Kexby Bridge, and Beverley, Molescroft, &c., United Trust should be continued until 1st November 1881, and no longer; that the amount expended out of the tolls on the repair of the roads should not be less than 1,000 *l.* per annum; and that no interest on the debt should be payable.

40. That the Dunford District Trust should be continued until 1st November 1879, and no longer; and that no interest on the debt should be payable.

41. That the Hedon and Hull Trust should be continued until 1st November 1878, and no longer; that the amount expended out of the tolls on the repair of the roads should not be less than 300 *l.*, and should not exceed 320 *l.*; and that no interest on the debt should be payable.

42. That the Hull and Hedon (New) Trust should be continued until 1st November 1881, and no longer; that the amount expended out of the tolls on the repair of the roads should not be less than 100 *l.*, and should not exceed 120 *l.* per annum; and that no interest on the debt should be payable.

43. That the Leeds and Collingham Trust should be continued until 1st November 1878, and no longer; that the amount expended out of the tolls on the repair of the roads should not be less than 300 *l.*, and should not exceed 350 *l.*; and that no interest on the debt should be payable.

44. That the York to Oswaldkirk Bank Trust should be continued until 1st November 1881, and no longer; that the amount expended out of the tolls on the repair of the roads should not be less than 200 *l.*, and should not exceed 220 *l.* per annum; and that the rate of interest on the debt should be reduced to 2 *l.* per cent.\*

45. That the Carnarvonshire (Old) Trust should be continued until 1st November 1882, and no longer; that the amount expended out of the tolls on the repair of the roads should not be less than 1,500 *l.* per annum; and that the rate of interest on the debt should be reduced to 2 *l.* per cent.

46. The following is a summary of the recommendations of your Committee in regard to each Trust referred to them:—

— I. —

COUNTY.	NAME OF TRUST.	ARRANGEMENTS.	TERM.
Derby - - -	Nottingham, Third District -	- - - -	1 November 1878
Hants - - -	Southampton, South District -	- - - -	1 November 1880.
Northumberland -	Elsdon and Reedwater - -	No interest payable -	1 November 1880.

\* As to the York and Oswaldkirk Bank Trust, the following letter was handed in to the Committee by the clerk of the Trust:—"To Jonathan Gray, Esq., Yorks, 10th October 1829, Combe Florey, Taunton. My dear Sir,—Nobody can more sincerely wish the prosperity of the road from York to Oswaldkirk than I do. I wish to you hard materials, diligent trustees, gentle convexity, fruitful tolls, cleanly gutters, obedient parishes, favouring justices, and every combination of fortunate circumstances, which can fall to the lot of any human highway. These are my wishes, but I can only wish, I cannot from the bottom of Somersetshire attend in person, as a letter (2*s.* 6*d.* postage) yesterday invited me to do. Perhaps you will have the goodness to scratch my name out of the list of trustees. You would be extremely pleased with this beautiful spot in a very beautiful county. Friendships and acquaintances are not speedily replaced, but as far as outward circumstances I am quite satisfied. If ever you come to this county I shall be very glad to see you. I remain, dear Sir, with sincere respect and good will, yours truly, *Sydney Smith*, Combe Florey, Taunton, 10th October 1829. I shall think, on the 15th, of my friends at the White Bear at Stillington. How honourable to English gentlemen, that once or twice every month half the men of fortune in England are jammed together at the White Bear, crushed into a mass at the Three Pigeons, or perspiring intensely at the Green Dragon."

## — II. —

COUNTY.	NAME OF TRUST.	ARRANGEMENTS.
Il - - -	Helston - - - - -	- - - - -
- - -	Cavendish Bridge and Holland Ward.	No interest payable - - - - -
- - -	Oakerthorpe and Ashborne - - -	- - - - -
- - -	Owler Bar - - - - -	Certain tolls to be reduced - - - - -
- - -	Honiton - - - - -	- - - - -
- - -	Bridport, First District - - -	- - - - -
- - -	Lyme Regis - - - - -	- - - - -
- - -	Lyme Regis, Crewkerne Branch - - -	- - - - -
- - -	Sherborne - - - - -	- - - - -
ster - - -	Lightpill and Birdlip - - - - -	- - - - -
- - -	Minchinhampton, Tetbury, and Bisley.	- - - - -
- - -	Stroud, Cainscross, and Minchinhampton, Lower Division.	- - - - -
- - -	Stroud, Cainscross, and Minchinhampton, Upper Division.	- - - - -
- - -	Stroud and Chalford - - - - -	- - - - -
- - -	Gosport, Bishop's Waltham, Wickham, and Chawton.	No interest payable - - - - -
- - -	Stockbridge and Basingstoke - - -	- - - - -
- - -	Titchfield and Cosham - - - - -	No interest payable - - - - -
d - - -	Leominster and Ledbury - - - - -	- - - - -
- - -	Presteigne - - - - -	- - - - -
- - -	Ashford and Ham-street - - - - -	No interest payable - - - - -
- - -	Bethersden - - - - -	Parish aid not to exceed 70 l. per annum; no interest payable.
- - -	Canterbury and Barham - - - - -	No interest payable - - - - -
- - -	Canterbury and Sandwich - - - - -	- - - - -
- - -	Dover to Sandgate - - - - -	- - - - -
- - -	Goudhurst - - - - -	- - - - -
- - -	Malling and Strood - - - - -	No interest payable; arrears of interest to be extinguished.
- - -	Wadhurst and West Farleigh - - -	- - - - -
ter - - -	Bolton and Nightingales - - - - -	- - - - -
- - -	Wigan and Preston, North of Yar-row.	- - - - -
1 - - -	Louth - - - - -	No money to be spent in repair of roads; no interest payable.
- - -	Spilsby - - - - -	No money to be spent in repair of roads; no interest payable.
- - -	Spilsby, Burton's Corner District - - -	- - - - -
gham - - -	Mansfield and Tibshelf - - - - -	No interest payable - - - - -
- - -	Nottingham and Loughborough - - -	Amount expended in repair of roads to be not less than 200 l. per annum; no interest payable.
- - -	Nottingham and Mansfield - - - - -	- - - - -
- - -	Nottingham and Newhaven, First District.	- - - - -
1 - - -	Botley and Newland - - - - -	Amount expended in repair of roads to be not less than 550 l. per annum; no interest payable; Botley toll-gate to be removed beyond Elm's Farm.
- - -	Charlbury Roads - - - - -	- - - - -
- - -	Stokenchurch and Woodstock - - -	No money to be spent in repair of roads; no interest payable.
- - -	Stokenchurch, Islip District - - -	No money to be spent in repair of roads; no interest payable.

COUNTY.	NAME OF TRUST.	ARRANGEMENTS.	Term after which the Trust is not to continue.
Salop - - -	Bishop's Castle, First District -	No money to be spent in repair of roads; no interest payable.	1 May 1878.
	Minsterley and Churchstoke - -	Amount expended in repair of roads to be not less than 250 l. per annum.	1 November 1878.
Cheshire - - -	Crewkerne - - - - -	Amount expended in repair of roads to be not less than 500 l. per annum; no interest payable.	1 November 1878.
	Minehead Roads - - - - -	- - - - -	1 November 1878.
Stafford - - -	Burton-on-Trent and Abbot's Bromley.	No interest payable - - - - -	1 November 1878.
	Cannock and Penkridge - - -	Amount expended in repair of roads to be not less than 100 l. per annum.	1 November 1878.
	Handsworth and Perry Barr, United	Amount expended in repair of roads to be not less than 500 l. per annum.	1 November 1878.
	Hanley and Bucknall - - - -	No money to be spent in repair of roads; no interest payable.	1 May 1878.
	Rugeley and Stone, and Branches -	No interest payable - - - - -	1 November 1878.
	Stone, Lane End, and Trentham -	Amount expended in repair of roads to be not less than 350 l. per annum; no interest payable.	1 November 1878.
	Uttoxeter and Stoke, and Millwich and Sandon.	Amount expended in repair of roads to be not less than 70 l. per annum; no interest payable.	1 November 1878.
	Wolverhampton, Old - - - -	- - - - -	1 November 1878.
Surrey - - -	Reigate - - - - -	Amount expended in repair of roads to be not less than 800 l. per annum; no interest payable.	1 November 1878.
Sussex - - -	Brighton, Shoreham, and Lancing	- - - - -	1 November 1878.
	Cowfold and Henfield, Old - -	- - - - -	1 November 1878.
	Mayfield and Wadhurst - - -	- - - - -	1 November 1878.
	Tunbridge Wells and Maresfield -	- - - - -	1 November 1878.
Worcester - - -	Stourbridge, United - - - -	- - - - -	1 November 1878.
York - - -	Beverley and Kexby Bridge, and Beverley, Molescroft, &c., United.	Amount expended in repair of roads to be not less than 1,000 l. per annum; no interest payable.	1 November 1878.
	Doncaster and Selby - - - -	- - - - -	1 November 1878.
	Dunford District - - - - -	No interest payable - - - - -	1 November 1878.
	Hedon and Hull - - - - -	Amount expended in repair of roads to be not less than 300 l., and limited to 320 l.; no interest payable.	1 November 1878.
	Holme-lane End and Heckmond-wike.	- - - - -	1 November 1878.
	Holmfirth District - - - - -	- - - - -	1 November 1878.
	Hull and Hedon, New - - - -	Amount expended in repair of roads to be not less than 100 l., and limited to 120 l. per annum; no interest payable.	1 November 1878.
	Keighley and Kendal, Yorkshire District.	- - - - -	1 November 1878.
	Leeds and Collingham - - - -	Amount expended in repair of roads to be not less than 300 l., and limited to 350 l.; no interest payable.	1 November 1878.
	Wakefield and Austerlands - -	- - - - -	1 November 1878.
	York to Oswaldkirk Bank - - -	Amount expended in repair of roads to be not less than 200 l., and limited to 220 l. per annum; rate of interest to be reduced to 2 l. per cent.	1 November 1878.
Carnarvon - - -	Carnarvonshire, Old - - - -	Amount expended in repair of roads to be not less than 1,500 l. per annum; rate of interest to be reduced to 2 l. per cent.	1 November 1878.
Flint - - -	Mold and Broughton, and Branch -	- - - - -	1 November 1878.

# PROCEEDINGS OF THE COMMITTEE.

*Friday, 9th March 1877.*

## MEMBERS PRESENT:

Lord George Cavendish.  
Mr. Wentworth Beaumont.  
Mr. Beach.  
Mr. Salt.

Sir Harcourt Johnstone.  
Mr. Spencer Stanhope.  
Mr. Wilbraham Egerton.

Lord GEORGE CAVENDISH was called to the Chair.

## Helston Turnpike Trust.

*Mr. Frederick Hill* was examined in respect of this Trust.

*Resolved*, That the Trust be continued till 1st November 1880, and no longer.

## Owler Bar Turnpike Trust.

*Mr. John Hallewell*, *Mr. Thomas Fidler*, and *Mr. William Hattersley*, were severally examined.

Motion made, and Question put, That this Trust be allowed to expire—(*Mr. Wentworth Beaumont*).—The Committee divided:

Ayes, 2.  
Mr. Beach.  
Mr. Wentworth Beaumont.

Noes, 4.  
Mr. Wilbraham Egerton.  
Sir Harcourt Johnstone.  
Mr. Spencer Stanhope.  
Mr. Salt.

*Resolved*, That the Trust be continued till 1st November 1880, and no longer; that the toll for every horse or other beast drawing any waggon, wain, cart (or other such like carriage), or any taxable conveyance with not more than two wheels, to be reduced to 3d.

*Resolved*, That the Committee, having been informed that a large number of Trusts are still in existence, whose terms will not expire for some years, are of opinion that such as are insolvent, and such as are not fulfilling the conditions on which their Acts were obtained, should be scheduled in the Continuance Act of 1877 for consideration in 1878.

## Bridport, First District, Turnpike Trust.

*Mr. John L. Kitson* and *Mr. John Edwin Bradfield* were severally examined.

*Resolved*, That the Trust be allowed to expire.

## Cavendish Bridge and Hulland Ward Turnpike Trust.

*Mr. W. H. Sale* was examined.

*Resolved*, That the Trust be continued till 1st November 1879, and no longer; that no further interest be allowed.

## Honiton Turnpike Trust.

*Mr. Horace Mules* and *Mr. George Blackburn* were severally examined.

*Resolved*, That the Trust be allowed to expire.

**Presteigne Turnpike Trust.**

Mr. *William Daggs* was examined.

*Resolved*, That the Trust be allowed to expire.

**Sherborne Turnpike Trust.**

Mr. *Charles Bartlett* was examined.

*Resolved*, That the Trust be allowed to expire.

[Adjourned till Tuesday next, at Twelve o'clock.

*Tuesday, 13th March 1877.*

**MEMBERS PRESENT:**

Lord GEORGE CAVENDISH in the Chair.

Mr. Beach.  
Sir Harcourt Johnstone.  
Mr. Wentworth Beaumont.  
Mr. Salt.

Lord Henry Thynne.  
Sir Robert Anstruther.  
Mr. George Clive.  
Mr. Spencer Stanhope.

**Lyme Regis Turnpike Trust, and Lyme Regis, Crewkerne Branch, Turnpike Trust.**

Mr. *R. W. Hillman* was examined in respect of these Trusts.

Mr *John Edwin Bradfield* was examined in support of Petition of Traders of Lyme Regis, against the continuance of the Trust.

*Resolved*, That the Trusts be allowed to expire.

**Gosport, Bishop's Waltham, &c., Turnpike Trust.**

Mr. *W. Kelsall* was examined in respect of this Trust.

Mr. *John Paddon*, Chairman of the Trust, was also examined.

Mr. *John Edwin Bradfield* was examined in support of the Petition of Inhabitants of Titchfield, &c., against the continuance of the Trust.

*Resolved*, That the Trust be continued until the 1st November 1878, and no longer, and that no further interest be allowed.

**Titchfield and Cosham Turnpike Trust.**

Mr. *W. Kelsall* was examined in respect of this Trust.

Mr. *John Edwin Bradfield* was examined in support of Petition of Inhabitants of Titchfield against the continuance of the Trust.

*Resolved*, That the Trust be continued until the 1st November 1878, and no longer, and that no further interest be allowed.

**Minchinhampton, Tetbury and Bisley Turnpike Trust.**

Mr. *Robert Clark Paul* was examined in respect of this Trust.

Mr. *John Edwin Bradfield* was examined in support of a Petition of Landowners in the district, against the continuance of the Trust.

*Resolved*, That the Trust be allowed to expire.

**Southampton (South District) Turnpike Trust.**

Mr. *H. D. M. Page* was examined in respect of this Trust.

Mr. *John Edwin Bradfield* was examined in support of the case of Dr. Fox.

*Resolved*, That the Trust be continued until 1st November 1880.



## Ashford and Ham-street Turnpike Trust.

Mr. *F. H. Hallett* was examined in respect of this Trust.

Mr. *John Edwin Bradfield* was examined in support of the Petition of Inhabitants of Orlestone, against the continuance of the Trust.

*Resolved*, That the Trust be continued until 1st November 1879, and no longer; and that no further interest be allowed.

## Bethersden Turnpike Trust.

Mr. *James Fraser* was examined in respect of this Trust.

Captain *T. Pattinson*, a Bondholder, was also examined.

Mr. *John Edwin Bradfield* was also examined.

*Resolved*, That the Trust be continued until 1st November 1880, and no longer; that no further interest be allowed, and that parish aid shall not exceed 70 *l*.

[Adjourned till Friday next, at Twelve o'clock.]

*Friday, 16th March 1877.*

## MEMBERS PRESENT :

Lord GEORGE CAVENDISH in the Chair.

Mr. Wilbraham Egerton.

Mr. Beach.

Mr. Wentworth Beaumont.

Sir Robert Anstruther.

Mr. George Clive.

Mr. Spencer Stanhope.

## Malling and Strood Turnpike Trust.

Mr. *John Noble Dudlow* was examined in respect of this Trust.

Mr. *John Edwin Bradfield* was examined on behalf of Shopkeepers, &c., of Snodland.

*Resolved*, That the Trust be continued till 1st November 1878, and no longer; that all arrears of interest be extinguished; that no further interest be allowed.

## Canterbury and Barham Turnpike Trust.

Mr. *Thomas Norman Wightwick* was examined in respect of this Trust.

Mr. *John Edwin Bradfield* was examined on behalf of Inhabitants of Canterbury, against continuance of the Trust.

*Resolved*, That the Trust be continued till 1st November 1878, and no longer; that no further interest be allowed.

## Dover to Sandgate Turnpike Trust.

Mr. *Richard Hart* was examined in respect of this Trust.

Mr. *John Edwin Bradfield* was examined, in support of Corporation of Folkestone, against continuance of this Trust.

Mr. *E. W. N. Knocker*, Town Clerk of Dover, was also examined.

Mr. *John Minter* was examined on behalf of Inhabitants of Sandgate.

Mr. *Henry L. Cripps* was also examined on behalf of some Bondholders.

*Resolved*, That the Trust be allowed to expire.

## Goudhurst Turnpike Trust.

Mr. *George Hinds* was examined in respect of this Trust.

*Resolved*, That the Trust be allowed to expire.

## Wigan and Preston, North of Yarrow, Turnpike Trust.

Mr. *Richard Finch* was examined in respect of this Trust

Mr. *John Porter* was also examined on behalf of the Leyland Hundred Highway Board, &c.

*Resolved*, That the Trust be allowed to expire.

## Louth Turnpike Trust.

Mr. *Henry Frederick Valentine Falkner* was examined in respect of this Trust.

*Resolved*, That the Trust be continued till 1st November 1878, and no longer; that no money be spent on repairs; that no further interest be allowed.

[Adjourned till Tuesday next, at Twelve o'clock]

*Tuesday, 20th March 1877.*

## MEMBERS PRESENT:

Lord GEORGE CAVENDISH in the Chair.

Mr. Beach.  
Mr. Wilbraham Egerton.  
Sir Harcourt Johnstone.  
Mr. Salt.

Mr. Wentworth Beaumont.  
Mr. Clare Read.  
Mr. Spencer Stanhope.

## Spilsby Turnpike Trust.

Captain *J. W. Preston* was examined in respect of this Trust.

Mr. *B. B. Dyer* was examined in support of the Petition of certain Landowners against continuance of the Trust.

*Resolved*, That the Trust be continued until 1st November 1878, and no longer; that no further interest be allowed.

## Botley and Newland Turnpike Trust.

Mr. *P. Walsh* was examined in respect of this Trust.

Mr. *Robert Hawkins* was also examined in support of the Petition of Corporation of Oxford against continuance of the Trust.

Mr. *Frederick Morell* was also examined on behalf of the Local Board.

*Resolved*, That the Trust be continued until 1st November 1880, and no longer; that not less than 550 l. be expended on the repair of the road; that the toll-bar be removed beyond Elms Farm, according to agreement, and that no further interest be allowed on the debt.

## Stokenchurch and Woodstock Turnpike Trust, and Stokenchurch (Islip Branch) Turnpike Trust.

Mr. *Thomas M. Davenport* was examined in respect of these Trusts.

Mr. *F. Morell* was also examined on behalf of the Local Board.

Mr. *Edwards* was also examined on behalf of the Bondholders.

Motion made, and Question put, "That the Trusts be continued until the 1st November 1878, and no longer; that no money be spent on the roads, and no interest be allowed"—(Mr. *Clare Read*).—The Committee divided:

Ayes, 4.

Mr. Salt.  
Mr. Beach.  
Mr. Wilbraham Egerton.  
Mr. Clare Read.

Noes, 2.

Sir Harcourt Johnstone.  
Mr. Wentworth Beaumont.

*Resolved*, That the Trusts be continued until the 1st of November 1878, and no longer; that no money be spent on the repair of the roads, and that no further interest be allowed.

**Mansfield and Tibshelf Turnpike Trust.**

Mr. John Radford was examined in respect of this Trust.

*Resolved*, That the Trust be continued until 1st November 1880, and no longer, and that no further interest be allowed.

**Nottingham and Loughborough Turnpike Trust.**

Mr. W. Gibson, jun., was examined in respect of this Trust.

Mr. R. Marsland was also examined on behalf of the Bondholders.

*Resolved*, That the Trust be continued until 1st November 1880, and no longer, and that no further interest be allowed; that not less than 200*l.* per annum be spent in repairs.

**Elsdon and Reedwater Turnpike Trust.**

Mr. Edward Lawson was examined in respect of this Trust.

*Resolved*, That the Trust be continued until 1st November 1880, and that no further interest be allowed.

[Adjourned till Friday next, at Twelve o'clock.

*Friday, 23rd March 1877.*

MEMBERS PRESENT:

Mr. WENTWORTH BEAUMONT in the Chair;

Afterwards, Lord GEORGE CAVENDISH in the Chair.

Mr. Salt.	Mr. George Clive.
Sir Robert Anstruther.	Mr. Beach.
Mr. Clare Read.	Mr. Wilbraham Egerton.
Mr. Spencer Stanhope.	Sir Harcourt Johnstone.

**Burton-on-Trent and Abbot's Bromley Turnpike Trust.**

Mr. William Small was examined in respect of this Trust.

*Resolved*, That the Trust be continued till 1st November 1882, and no longer; that no further interest be allowed.

**Wolverhampton, Old District, Turnpike Trust.**

Mr. Henry Kitson was examined in respect of this Trust.

*Resolved*, That the Trust be continued till 1st November 1880, and no longer.

**Cannock and Penkridge Turnpike Trust.**

Mr. John Nevitt was examined in respect of this Trust.

*Resolved*, That the Trust be continued till 1st November 1880, and no longer; that not less than 100 *l.* per annum be spent on the repair of the roads.

**Bishops Castle, First District, Turnpike Trust.**

The Earl of Powis (a Member of the Upper House) was examined in respect of this Trust.

*Resolved*, That the Trust be continued till 1st May 1878, and no longer; that no further interest be allowed; that no money be spent on the repair of the roads.

**Minsterley and Churchstoke Turnpike Trust.**

Mr. T. M. How was examined in respect of this Trust.

*Resolved*, That the Trust be continued till 1st November 1879, and no longer; that not less than 250 *l.* per annum be spent on the repair of the roads.

**Wakefield and Austerlands Turnpike Trust.**

*Mr. John Henry Abbey* was examined in respect of this Trust.

*Resolved*, That the Trust be continued till 1st November 1882, and no longer.

**Crewkerne Turnpike Trust.**

*Mr. John Hussey* was examined in respect of this Trust.

*Mr. John Sparkes* was examined on behalf of the Bondholders.

*Mr. John Edwin Bradfield* was examined in support of the Petitions of certain Farmers and Inhabitants of Crewkerne, against the continuance of the Trust.

*Resolved*, That the Trust be continued till 1st November 1879, and no longer; that not less than 500 *l.* be spent on the repair of the roads; that no further interest be allowed.

**Handsworth and Perry Barr United Turnpike Trust.**

*Mr. W. H. Ginger* was examined in respect of this Trust.

*Resolved*, That the Trust be continued till 1st November 1879, and no longer; that not less than 500 *l.* per annum be spent on the repair of the roads.

[Adjourned till Tuesday next, at Twelve o'clock.]

*Tuesday, 27th March 1877.*

**MEMBERS PRESENT :**

Lord GEORGE CAVENDISH in the Chair.

*Mr. Wentworth Beaumont.*  
*Lord Henry Thynne.*  
*Mr. Salt.*

*Mr. Wilbraham Egerton.*  
*Mr. Clare Read.*  
*Sir Harcourt Johnstone.*

**Hanley and Bucknall Turnpike Trust.**

*Mr. John Elliott* was examined in respect of this Trust.

*Mr. Arthur Challinor* and *Mr. Joseph Loble* were also examined in support of Local Board of Hanley, against the continuance of the Trust.

*Resolved*, That the Trust be continued till 1st May 1878, and no longer; that no money be spent on the repair of the roads; that no further interest be allowed.

**Rugeley and Stone, and Branches Turnpike Trust.**

*Mr. George Willmot* was examined in respect of this Trust.

*Resolved*, That the Trust be continued till 1st November 1882, and no longer; that no further interest be allowed.

**Stone, Lane End, and Trentham Turnpike Trust.**

*Mr. F. B. Cooper* was examined in respect of this Trust.

*Resolved*, That the Trust be continued till 1st November 1879, and no longer; that no further interest be allowed; that not less than 350 *l.* per annum be spent on the repair of the roads.

**Uttoxeter and Stoke, and Milwich and Sandon Turnpike Trust.**

*Mr. Edward John Blair* was examined in respect of this Trust.

*Mr. Ralph Stevenson*, a Bondholder, was also examined.

*Resolved*, That the Trust be continued till 1st November 1880, and no longer; that no further interest be allowed; that not less than 70 *l.* per annum be spent on the repair of the roads.

## Doncaster and Selby Turnpike Trust.

Mr. *William W. Willink* and Mr. *Thomas Newman Hunt* were examined in respect of this Trust.

Mr. *Robert John Parker* was also examined in support of the Petitions of the Townships on the road, against the continuance of the Trust.

*Resolved*, That the Trust be allowed to expire.

## Reigate Turnpike Trust.

Mr. *John Lees* was examined in respect of this Trust.

Mr. *John E. Bradfield* was also examined in support of the Petitions of Landowners, &c., from Carshalton, Cheam, Ewell, Reigate, Redhill, Horley, Sutton, Kingswood and Banstead, against the continuance of the Trust.

*Resolved*, That the Trust be continued till 1st November 1881, and no longer; that no further interest be allowed; that not less than 800 *l.* per annum be spent on the repair of the roads.

[Adjourned till Tuesday, May 1st, at Twelve o'clock.]

*Tuesday, 1st May 1877.*

## MEMBERS PRESENT:

Mr. Wentworth Beaumont.  
Sir Harcourt Johnstone.  
Lord Henry Thynne.  
Mr Salt.

Sir Robert Anstruther.  
Mr. Wilbraham Egerton.  
Mr. Spencer Stanhope.  
Mr. Beach.

In the absence of the Chairman, Mr. WENTWORTH BEAUMONT was called to the Chair.

## Brighton, Shoreham and Lancing Turnpike Trust.

Mr. *William John Williams* was examined in respect of this Trust.

Mr. *John Edwin Bradfield* was also examined in behalf of the Corporation of Brighton, &c., against the continuance of the Trust.

*Resolved*, That the Trust be continued till 1st November 1878, and no longer.

## Stourbridge United Turnpike Trust.

Mr. *George Wilmot* was examined in respect of the Trust.

*Resolved*, That the Trust be allowed to expire on 1st November next.

## Beverley, and Kexby Bridge, and Molescroft, &amp;c., United Turnpike Trust.

Mr. *Thomas Shepherd* was examined in respect of this Trust.

*Resolved*, That the Trust be continued till 1st November 1881, and no longer; that no further interest be allowed; that not less than 1,000 *l.* per annum be spent on the repair of the roads.

## Nottingham, Third District, Turnpike Trust.

Mr. *Philip Hubbersty* was examined in respect of this Trust.

*Resolved*, That the Trust be continued till 1st November 1878.

## 'Tunbridge Wells and Maresfield Turnpike Trust.

Mr. *John Lewis* was examined in respect of this Trust.

Mr. *John Edwin Bradfield*, in behalf of certain traders, was also examined against the continuance of the Trust.

*Resolved*, That the Trust be allowed to expire.

**Dunford District Turnpike Trust.**

*Mr. Harry Heeley* was examined in respect of this Trust.

*Mr. Spencer Stanhope*, a Member of the Committee, and one of the Bondholders, was examined.

*Mr. Samuel S. Booth*, on behalf of *Mr. John Turner*, and *Mr. William Harpin*, certain landowners, was also examined.

*Resolved*, That the Trust be continued till 1st November 1879, and no longer; that no further interest be allowed.

**Holmfirth District Turnpike Trust.**

*Mr. Harry Heeley* was examined in respect of this Trust.

*Mr. Samuel S. Booth* was examined on behalf of certain residents in the district, against the continuance of the Trust.

*Resolved*, That the Trust be allowed to expire.

A letter was received from *Mr. Hugh Owen*, Assistant Secretary to the Local Government Board, acknowledging the receipt of the letter containing the Resolution of the Committee agreed upon on the 9th ultimo, and stating that the matter was still under the consideration of the Local Government Board.

*Resolved*, That the following Trusts be allowed to expire on 1st November next:—

Oakethorpe and Ashborne.  
 Lightpill and Birdlip.  
 Stroud, Cainscross, and Minchinhampton, Lower Division.  
 Stroud, Cainscross, and Minchinhampton, Upper Division.  
 Stroud and Chalford.  
 Stockbridge and Basingstoke.  
 Leominster and Ledbury.  
 Canterbury and Sandwich.  
 Wadhurst and West Farleigh.  
 Bolton and Nightingales.  
 Nottingham and Mansfield.  
 Nottingham and Newhaven, First District.  
 Charlbury Roads.  
 Cowfold and Henfield, Old.  
 Mayfield and Wadhurst.  
 Holme Lane End and Heckmondwike.  
 Keighley and Kendal, Yorkshire District.

[Adjourned till Friday next, at Twelve o'clock.]

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*Friday, 4th May 1877.*

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**MEMBERS PRESENT:**

*Mr. WENTWORTH BEAUMONT* in the Chair.

*Mr. Salt.*  
*Lord Henry Thynne.*  
*Mr. Spencer Stanhope.*  
*Mr. Clare Read.*

*Sir Harcourt Johnstone.*  
*Mr. Wilbraham Egerton.*  
*Sir Robert Anstruther.*

**Hedon and Hull Turnpike Trust.**

*Mr. William Watson* was examined in respect of this Trust.

*Mr. Charles Spilman Todd*, Town Clerk of Hull, was also examined.

*Resolved*, That the Trust be continued till 1st November 1878, and no longer; that no further interest be allowed; that not less than 300 £ nor more than 320 £ per annum be spent on the repair of the roads.

## Hull and Hedon (New) Turnpike Trust.

Mr. *Arthur Iveson*, jun., was examined in respect of this Trust.

Mr. *Charles Spilman Todd*, Town Clerk of Hull, was also examined.

*Resolved*, That the Trust be continued till 1st November 1881, and no longer; that no further interest be allowed; that not less than 100 *l.* nor more than 120 *l.* per annum be spent on the repair of the roads.

## Leeds and Collingham Turnpike Trust.

Mr. *Thomas Greenwood Teale* was examined in respect of this Trust.

*Resolved*, That the Trust be continued till 1st November 1878, and no longer; that no further interest be allowed; that not less than 300 *l.* nor more than 350 *l.* per annum be spent on the repair of the roads.

## York to Oswaldkirk Bank Turnpike Trust.

Mr. *William Gray* was examined in respect of this Trust.

*Resolved*, That the Trust be continued till 1st November 1881, and no longer; that the interest be reduced to 2 per cent.; that not less than 200 *l.* nor more than 220 *l.* per annum be spent on the repair of the roads.

## Carnarvonshire, Old, Turnpike Trust.

Mr. *Owen Jones* was examined in respect of this Trust.

*Resolved*, That the Trust be continued till 1st November 1882, and no longer; that the interest be reduced to 2 per cent.; that not less than 1,500 *l.* per annum be spent on the repair of the roads.

## Mold and Broughton and Branch Turnpike Trust.

Mr. *Alfred Thomas Keene* was examined in respect of this Trust.

*Resolved*, That the Trust be continued till 1st November 1879, and no longer.

[Adjourned till Tuesday, 15th May, at Twelve o'clock.

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*Tuesday, 15th May 1877.*

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## MEMBERS PRESENT:

Lord GEORGE CAVENDISH in the Chair.

Mr. Wentworth Beaumont.  
Sir Robert Anstruther.  
Sir Harcourt Johnstone.

Mr. Salt.  
Mr. Beach.  
Mr. Wilbraham Egerton.

DRAFT REPORT read the first and second time, amended, and *agreed to*.

Question, That this be the Report of the Committee to the House, put, and *agreed to*.

*Ordered*, To Report.

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R E P O R T

FROM THE

SELECT COMMITTEE

OR

TURNPIKE ACTS CONTINUANCE;

WITH THE

PROCEEDINGS OF THE COMMITTEE.

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*Ordered, by The House of Commons, to be Printed,  
15 May 1877.*

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207.

*Under 2 oz.*















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